

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

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Vol. VI No. 20

## Including System Certification

# SJCC Awaits Afips Progress Reports

By Edward J. Bride

Of the CW Staff

ATLANTIC CITY, N.J. — The computer community is taking another pause this week, to examine some practical problems and technical advances of today's data processing world.

Employment and training programs, new hardware and software, the computer's impact on the general public, the state of the computer industry and more effective DP usage are all under examination here Tuesday to Thursday at the Spring Joint Computer Conference (SJCC).

### Progress Reports

The equipment itself takes the back seat, in favor of progress reports from various corners of the industry, including the sponsoring organization, the American Federation of Information Processing

Societies (Afips).

Afips officials are expected to discuss the new system certification program, designed in part to head off government regulation of computer systems which affect the public [CW, April 5].

Afips said it hoped to interview interested individuals during SJCC, with the goal of starting work on the first "Systems Review Manual" for security and privacy.

Keith Uncapher, Afips president, was expected to deliver a major address regarding the current industry status, and near-term marketing possibilities.

His Wednesday morning address was planned as the opening event of "World Trade Day," jointly sponsored by Afips and the U.S. Department of Commerce (DOC).

As part of the World Trade Day luncheon, the DOC will discuss changing

world markets, opportunities for U.S. industry, the need for increased exports and information and services available to U.S. organizations to aid in overseas marketing.

Marinus van Gessel, new acting director of the DOC's Bureau of International Commerce, will deliver the luncheon address, followed by a three-hour marketing seminar.

An official of DOC said the "contributions of the U.S. computer field in re-establishing a favorable balance of trade" are "critical."

While the semiannual joint computer conferences remain the showcase for state-of-the-art equipment, the advances have tapered off during the current recession. New products are fewer in number, at this 40th conference, and less dramatic in technical breakthroughs.

(Continued on Page 2)

## 13 Models Beef Up Burroughs 700s

By Frank Piasta

Of the CW Staff

DETROIT — Burroughs nearly doubled the number of medium-scale computers offered to its users last week with the introduction of 13 models in the 700 Series, including its first solid-state memory systems.

Burroughs also announced a new version, MCP-V, of its master control program for the new models as well as all current B4700, B3500 and B2500 models.

A data communications processor for the B4700, B3700 and B2700 models was also introduced.

### 80 I/O Channels

The five B4700 models include versions with from one to four CPUs and I/O systems. They include a basic system with 150k to 500k bytes of core memory and eight to 20 I/O channels. Larger models provide additional I/O and two, three and four CPUs. The largest model provides up to 80 I/O channels and up to 2 Mbytes of

memory arranged in independent subsystems.

Cycle time is 250 nsec for the five 4700 models. The I/O subsystem transfers data at up to 4 Mbyte/sec for each processor, twice that of current B4700 models.

The B3700 is available in both single- and dual-processor versions. The B3700 processor is up to 70% more powerful than the current B3500 processor, according to Burroughs.

The single processor B3700 can have from eight to 20 high-speed and low-speed I/O channels and 100k to 300k bytes of main memory. The two-processor model can have up to 40 I/O channels and up to 600k bytes of memory arranged in independent subsystems.

The 3700 introduces Burroughs' first solid state memory with a cycle time of 333 nsec. The I/O subsystem transfers data at up to 3 Mbyte/sec, 50% faster than the B3500.

The six models of the B2700 Series are newer versions of the B2500 and B3500 with better price/performance ratios.

Five of the models are single-processor systems while the sixth is a dual-processor version. Cycle times of the various models are 1.5  $\mu$ sec, 1.0  $\mu$ sec and 500 nsec.

A basic B2700 system has six I/O channels and 30k to 60k bytes of core memory. Larger single-processor systems can have up to 20 I/O channels and up to 300k bytes of main memory. The dual-processor model can include 40 I/O channels and up to 600k bytes of memory arranged in independent subsystems. Each I/O subsystem transfers data at up to 2 Mbyte/sec.

### Multiple Configurations

Head/track disk file subsystems are used to couple the processors in multiple processor configurations, allowing access to a common data base. A file protect memory feature protects data bases from destruction by unauthorized users in the systems.

The Data Communications Processor

(Continued on Page 2)

## Switch Called Illegal Bell 'Unplugs' User's MCI Line

By Ronald A. Frank

Of the CW Staff

CHICAGO — A Microwave Communications Inc. (MCI) data user has had his interstate MCI line disconnected by Illinois and Southwestern Bell without prior notice. The Illinois Telephone Co. said a switch installed by MCI, allowing the user to alternate his Bell modem between MCI's line and a Bell System dial-up line, was a violation of a state tariff, but the issue may have to be decided by AT&T on an interstate level.

MCI, the new specialized carrier providing service between Chicago and St. Louis, installed the switch to give Sweetheart Cup Corp. a dual capability. With the switch in one direction the Bell

202C-11 could be used to transmit via MCI line from Chicago to St. Louis. And with the switch in the other position, the 202 data set was used to transmit via Bell dial-up lines to Wilmington, Del.

But the phone company objected to the use of a Bell modem on an MCI line. Bell provides both lines and equipment as a package and the phone company is not a hardware supplier, according to an AT&T spokesman. Agreements between MCI and Bell apparently prohibit the use of phone company equipment on MCI lines.

A similar dual-line situation occurs when TWX users add a data line to their Teletype. In such cases, Western Union installs a switch to allow the user to

(Continued on Page 2)

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NEWS  
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## CDC, IBM Ordered To Have Suit Ready

ST. PAUL, Minn. — A federal court here has ordered IBM and Control Data Corp. to have their antitrust case ready for trial next May.

In Pretrial Order Number 11, Judge Philip Neville ordered lawyers for plaintiff CDC and defendant IBM to meet this month, to "agree on the remaining discovery and depositions schedules."

Neville called some of IBM's pretrial information "inadequate," noting he was "not satisfied" with memorandum responses such as "don't know" or "don't understand." He ordered IBM to "use its best efforts to comply" with CDC.

He also ordered Commercial Credit Co., a CDC subsidiary, to outline its case against IBM by June 1, and ordered IBM to reply by July 15.

## Honeywell Institute DP School Attacked

FULLERTON, Calif. — Two tape drives at the Honeywell Institute of Information Sciences were damaged last week when unidentified persons smashed two plate glass windows of the computer center and tossed in two burning flares.

The flares smoldered and ignited windows curtains in the computer center damaging the tape drives before the fire burned itself out, according to a Honeywell spokesman. Workers at the center discovered the damage when they arrived and evidently no building fire alarm system had been set off.

The school for programmers and operators is located across the street from the California State University at Fullerton, but police were not inclined to think there was any relationship between the incident and recent anti-war demonstrations.

No one was in the office building. Honeywell occupies the first two floors of the four-story building.

## On the Inside This Week

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(CW Photo by R.A. Frank)

Sweetheart's Jim Doody transmits order invoices via his Sycor terminal.



# Microfiche Handling Equipment Rules NMA Show for 12,000

By Frank Piasta  
Of the CW Staff

NEW YORK — The National Microfilm Association's annual convention and exhibits drew an estimated 12,000 attendees here, down somewhat from previous years.

The drop in numbers, however, was more than offset by the increasing sophistication of the attendees. "We're no longer selling concepts in many cases; we're now selling the equipment," said one exhibitor.

The number of exhibitors (100 was also down about 15% from prior years, but the quality of the products was much higher, with many "borderline" companies gone from the scene, in the opinion of some viewers.

The emphasis was on microfiche handling equipment. Every booth seemed to feature readers, copiers or processing equipment for the wide film format, indicating a shift in emphasis away from the more traditional 16mm and 35mm sizes.

New computer-related equipment was at a premium, with companies like Kodak, one of the two largest exhibitors, relying on the well-known Kom 80 and the mini-based Hewlett-Packard Reformatting System which was brought out at the last FJCC.

## IBM-Compatible COM

Calcomp introduced its Series 2100 Alphanumeric COM system which can operate either on-line to an IBM 360 or 370 or as a stand-alone unit. The on-line version costs \$31,600.

Gould Data Systems chose the NMA show to introduce an on-line printer option for its Betacom 600L and 700L COM systems. Two printers are available, a 600 line/min drum printer and an electrostatic 3,000 line/min printer allowing the Betacom to be used for off-line printing and simultaneous hard-copy and microfilm output.



**COMPUTERWORLD**  
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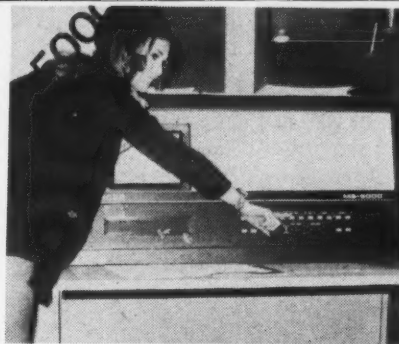


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The Datagraphix Laser COM, demonstrated in prototype form during the show, was claimed as a first. The company estimated it would be in production by 1974 and would be competitively priced.

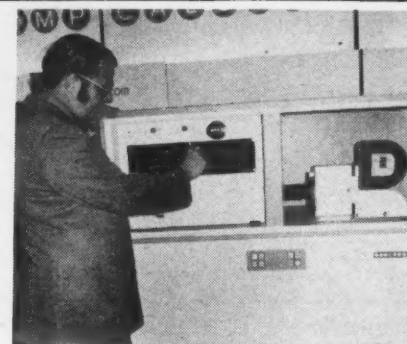
## Aperture Card

The Automatic Aperture Card Illustration Merger option (Amacim) on the Singer Micrographic Systems MS-5000 computer microfilm plotter-printer demonstrated its ability to merge data from a CRT with parts illustrations mounted on 35mm aperture cards.



The Singer MS-5000 is a high-resolution microfilm printer-plotter.

Bell & Howell showed its Inter/Com, a compact device that can transcribe computer printout to microfilm at 5,000 line/min with a 26:1 reduction ratio. It is priced at \$2,395, according to the



Calcomp 2100 COM unit can be used on- or off-line. (CW Photos by F.J. Piasta)

company. A system that uses both microform retrieval and terminal operation, on-line to a computer through the same CRT was demonstrated at the Varian Adco booth.

## Progress Reports Expected on Certification

(Continued from Page 1)

Most of the new items appear to be improvements or enhancements to previously announced products, and are in the area of communications, terminals and other peripherals and components. The exhibits and technical program both take place in the old east section of Convention Hall.

About 30% of the technical program deals with programming and software, and 20% with general and special-purpose hardware, with one session devoted specifically to communications.

Three sessions dealing with "administrative issues" are panel discussions.

The first, "the computer as supertoy," was scheduled for Tuesday morning. The

other two sessions are Wednesday afternoon, and are more directly related to practical aspects.

Afips Executive Director Bruce Gilchrist is expected to discuss projected "over-supplies" in some DP jobs and "critical shortages" in others, in a session entitled "Manpower for Computers — Heyday and Cutback."

The other Wednesday panel meeting has as its topic the "Dilemma of Installation Management," and the special problems of the computer utility, likely problems to arise in the next 10 years and an appraisal of currently unresolved problems.

The panel will be comprised of representatives of Lawrence Livermore Labora-

tory, the National Institutes of Health and the National Bureau of Standards.

On Thursday, the final day of the conference, Roy N. Freed will conduct a clinic on computer contracts. One of the basic premises of his workshop will be that "many agreements do not describe adequately the very fundamental matter" of what the supplier "is to do or deliver."

Also on Thursday, Dr. Andrei Ershov will deliver the luncheon address on "the aesthetics and human factors of programming," at the Howard Johnson Motor Hotel. Ershov is one of the leading Soviet programmers and computer science specialists, and is a professor at Novosibirsk University.

## 13 Models Beef Up Burroughs 700 Line, MCP Version Added

(Continued from Page 1)

(DCP), available with all three series, expands the data communications capability and provides high-speed transfer to the CPU through a direct memory access. The DCP removes most of the data communications responsibilities from the CPU. A modular memory with a cycle time of 1.5  $\mu$ sec can be expanded from 16K to 32K bytes in 4K increments. Its line capacity can be increased from a minimum of 16 lines to 64 lines in 16 line increments.

The MCP-V version of the master control program can be used with the B2500 and B3500 systems as well as with the B2700, B3700 and B4700. Tests indicate that a throughput performance increase of 10% to 20% can be achieved with the new MCP, Burroughs said.

Burroughs also disclosed that applications packages for the B2700, B3700 and B4700 would be priced separately from the rest of the system. Burroughs previously had been completely bundled.

Software for the systems includes Fortran, Cobol and expanded Basic compilers, remote job entry software and Burroughs Programming Language (BPL). Conversion software is available to help

Model	No. CPUs & IOPs	Memory Range (Bytes)	Cycle Time	Channels (Low Speed/High Speed)	
				Min	Max
		B4700			
B4708	1	150k – 500k	250 nsec	8 (4/4)	20 (10/10)
B4731				10 (5/5)	
B4732	2	300k – 1M		18 (10/8)	40 (20/20)
B4733	3	450k – 1.5M		26 (15/11)	60 (30/30)
B4734	4	600k – 2M		34 (20/14)	80 (40/40)
		B3700			
B3771	1	100k – 300k	333 nsec	8 (4/4)	20 (10/10)
B3772	2			18 (10/8)	40 (20/20)
		B2700			
2731	1	30k – 60k	1.5 $\mu$ sec	6 (3/3)	6 (3/3)
2741			1.0 $\mu$ sec		
2751			500 nsec		
2761		60k – 150k	1.0 $\mu$ sec	3 (3/3)	10 (5/5)
2771		60k – 300k	500 nsec	6 (3/3)	20 (10/10)
2772	2	120k – 600k	500 nsec	12 (6/6)	40 (20/20)

Statistics on 13 Models of Burroughs 700 Series

IBM users convert to Burroughs systems. Programs written in Cobol, RPG and Autocoder are converted to Burrough's languages.

The new models in the B4700 Series will be available for delivery in the first quarter of 1973. B3700 models will be available in the fourth quarter of 1972 and B2700 models in the third quarter.

Purchase prices for the B4700 Series range from \$840,000 to \$2.7 million. Monthly lease prices range from \$17,000

to \$75,000.

Purchase prices for the B3700 Series are from \$660,000 to \$2.1 million. Monthly lease prices range from \$14,000 to \$42,000.

Purchase prices for the B2700 Series are from \$260,000 to \$750,000. Monthly lease prices range from \$5,500 to \$15,000.

Basic configuration on the B2731 includes 30k bytes main memory, operator console, printer keyboard, 475 card/min reader, 100 card/min punch, 475 line/min printer, 18k byte/sec 2 station magnetic tape cluster and 10 Mbyte of head/track disk storage. It costs \$264,000 or \$5,500/mo.

Basic configuration on the B3771 includes 100k bytes main memory, operator console, printer keyboard, 800 card/min reader, 1100 line/min printer, three-144k byte/sec tape units and 80M bytes of head/track disk storage. It costs \$664,800 or \$16,050/mo.

Basic configuration on the B4708 includes 200k bytes main memory, operator display console, 1,400 card/min reader, 1,100 line/min printer, four tape units, four-240k byte/sec tape units, 20M bytes of head/track disk storage, and 121M bytes disk pack-type storage. It costs \$851,600 or \$20,340/mo.

## Bell 'Unplugs' User's Line, Switch Cited

(Continued from Page 1)

alternate between Western Union's TWX line and the Bell dial-up line. But an AT&T source said the situation is not the same since Bell installs a second modem (the TWX modem is in the TTY) when it installs the data line phone.

While the inter-carrier regulatory questions are pondered by Bell, Sweetheart Cup has been forced to transmit its data via expensive dial-up circuits.

"They were rather abrupt about this thing," says Jim Doody, systems manager at Sweetheart. When Illinois Bell told Doody his switch violated local tariffs, it disconnected the 202 from the MCI line thereby limiting data transmissions to the Bell dial-up line.

Doody has told Bell and MCI he wants to use only one modem to transmit data via MCI or Bell. MCI has said it will provide a Sangamo data set, equivalent to the Bell unit, if the telephone company will allow the use of a switch between the two lines.

Sweetheart Cup has been waiting two weeks for Bell to decide whether to approve the Sangamo set on both lines. "Customer-provided modems can be connected to Bell lines using a DAA," according to an AT&T spokesman. But the Sangamo modem is provided by a new common carrier, MCI. And carrier-provided equipment can be installed without connecting arrangement, according to Bell regulations.



## Check-Swindling Ring Submitted Phony Pay Reports to DP Center

By E. Drake Lundell Jr.  
Of the CW Staff

NEW YORK — Payroll swindle involving the Board of Education's computer system has been uncovered by Brooklyn District Attorney Eugene Gold's staff.

Gold charged that the check-swindling ring submitted fraudulent payroll reports to the computer center claiming hours worked by teachers no longer employed by the city.

The computer system processed the reports in a normal manner without discovering that checks were being issued to non-existent employees, Gold said, apparently because the system was not programmed to make note of former employees.

John K. Herrick, employed by the Board of Education, has been arrested and charged with grand larceny in the second degree; possession of a forged instrument; and criminal possession of stolen property, all felonies.

He faces a possible maximum prison term of 21 years and is currently free on personal recognizance until a May 25 hearing, according to the district attorney's office.

The swindle defrauded city, state and federal education programs of \$40,000 during a four-month period, Gold said.

Officials from the Board of Education's Bureau of Audit and Finance became aware of the swindle after the board's payroll computer rejected a card because the name on it was misspelled. On investigation, it was discovered that the teacher named was no longer with the Board of Education, Gold said.

Further investigation disclosed that at least five other teachers no longer working for the city were named on checks, Gold said. The addresses given for the names turned out to be the addresses of answering services, he said.

Gold gave this account of how the

swindle worked:

The city, state and federal programs were at various locations throughout the city. Each location would submit its payroll by sending individual payroll reports for each employee. The reports were then fed into the board's computer system.

Someone would insert the extra payroll reports and retrieve them after they had been processed by the computer system.

The checks were then mailed to the answering services which in turn sent them to a post office box number in Long Island.

The checks were then traced to various banks by police, where new accounts had been opened with the checks. Most banking was done by mail.

The programs under which the phony checks were drawn included the state-funded Parent Education and Welfare programs and the city-funded Apprentice Teachers program, the Per Diem Sub-

## ...And File Juggling Defrauds State

By a CW Staff Writer

LEXINGTON, Ky. — Manipulation of billing files helped two men here defraud the state of more than \$61,800, according to a court action filed here recently.

The two men, Donald Burcham, manager of National Credits Inc., and James Robinson, assistant administrator of the University of Kentucky Medical Center, have been arrested and charged with defrauding the state, and released on \$25,000 bond each pending hearings in the case.

Bill payments to the Medical Center were collected from various insurance companies and deposited in dummy accounts in several banks during the past 10 months, sources said.

At the same time, they added, the accounts were cancelled in the Medical

Center's computer system by either being marked "uncollectable" or by being removed from the computer's files.

The Commonwealth's attorney refused to give any details in the case or discuss the role played by the two arrested men.

The fraud was uncovered, he said, however, when one account was not removed from the files and an insurance company received a second bill.

The company told the center that the bill had been paid and delivered the cancelled check as evidence, he said.

The hospital had no record of the payment, he said, and an investigation revealed the dummy accounts and the payments — the largest for \$8,000.

stitute Payroll and the After School Workshop for New Teachers.

Herrick was employed to train audiovisual equipment operators for employment in New York City Schools, a

\$17,600 post, from which he has been suspended pending the outcome of the case, Gold said.

The investigation is continuing and there may be further arrests, Gold said.

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## Legislature Passes Software Exemption

SACRAMENTO, Calif. — A bill that would give users and vendors a two-year reprieve from taxes on software has been passed by both the Senate and Assembly, and is expected to get the governor's signature.

The Assembly, which passed the measure several weeks ago [CW, April 12], last week agreed, by a 27-0 vote, to an amendment by the Senate.

The Senate amendment broadens the benefits of the bill for the computer industry, exempting bundled software as well as unbundled software.

## Hawaii, U.S. Bureau Differ On Population Figures

HONOLULU — The State of Hawaii may not be growing as fast as one computer seems to think.

The U.S. Census Bureau has predicted that the population of Hawaii by 1990 will reach at least 933,000 and go as high as 1,245,000, but state statistician Robert Schmitt disagrees.

He said the computer's calculations are based on nationwide birth and death rates and do not take into account certain distinctive features of Hawaii.

Thirty percent of the babies born in Hawaii are born to military families and leave Hawaii in three years, he said, while the computer assumes these children remain in Hawaii to become part of the population.

Also, according to the Census Bureau, Hawaii has one of the highest death rates. But, Schmitt said, the computer takes into account the "very high death rate" among non-whites (Negroes and American Indians). This works for mainland states, but not for Hawaii where the non-white population is mostly Orientals.



## Navy DP Seminar Told

# 'Desperate' Need Seen for Good Measurement Tools

By Edward J. Bride  
Of the CW Staff

QUONSET POINT, R.I. — Hardware and software measurement tools are an absolute necessity in managing a computer installation. Without them, "you can preside, but you can't manage."

Variations on this theme were expressed by nearly every speaker at a DP seminar, sponsored by a multi-installation Navy data processing advisory group here.

Cmdr. Stephen R. Ruth of the Navy's Fleet Material Support Office (FMSO), suggested, "To manage and have control, you have to be able to measure."

Without measurement, "you may preside, but you're not managing," he commented.

The director of FMSO's Computer Environment Division, Ruth observed "we don't have as strong a hold on measurement in the computer culture" as in other

"cultures."

Key punching is one area in which the Navy has been able to set some measurement guides, and incentives, he noted. But in operations "we could do better."

In the near term, there will be a "desperate" need for good measurement tools in computer operations, particularly in multiprogramming environments, Ruth noted.

Some form of measurement can be applied to applications programming, Ruth continued, suggesting the types of programs, instructions per hour, assemblies or compiles per program, error rates and maintenance as possible criteria.

### Third-Generation Problem

The measurement area is made more complex with third-generation hardware, he continued, because of varying CPU performance, file structures, job sched-

uling, data management techniques and even language selection.

Simple hardware monitors can alleviate that problem, he added. But even with these devices, what the manager learns is "how much of the system is burned up in system software," Ruth said.

"Not that much computing goes on in business data processing," he said. Most of the work is more aptly termed "data manipulation," and the manager needs to know when certain routines are not being used (so as to make the processor more available for computing).

As budget crunches become even greater, measurement will become more important, he suggested. Ruth is required to cost-justify his measurement device every three months, he added, "to make sure it's paying for itself." His CPA 3300 (now marketed by Compress) has been used to measure the performance of IBM,

Burroughs, RCA and Univac computers, he noted.

Luncheon speaker Dick Brandon reassured that users do not know how to measure "the performance of people or of an installation."

Using systems analysts as an example, Brandon suggested the difference between a competent and an incompetent analyst is great, "but the salary difference is almost nil."

Brandon, president of Brandon Applied Systems Inc., and a programmer by trade, said "I could go to work at any DP installation for 18 months, do nothing and you'd never know it."

### Better Standards

He called for better standards ("in 1972 I shouldn't be saying this"), better public relations to attract more qualified people to the industry ("if there were only one society, that might work, but we have ten, all working against each other") and better performance measurement "to re-establish management control."

Columnist and consultant Alan Taylor discussed the hardware-software approaches to monitoring, noting a hardware monitor detects actions at the time of production, and asked "would it not be better to do this during test?" through software.

It appears that users "just have a vague awareness" of systems design, Taylor said, adding that scheduling and design of systems are one basic area where control is possible. The others are the data, tests on specific systems and close monitoring of changing situations within a program or data base.

The Navy seminar was attended by about 250 military and civilian DP specialists from the Narragansett Bay area, and was sponsored by the Newport Naval Base DP Advisory Group, which is comprised of users from several Naval activities on both sides of the bay.

Few of the users in the group have third-generation hardware, but many have plans to install such equipment this year, and keynote speaker Rear Admiral Philip Crosby commented that half the Navy's CPUs are 10-years-old.

### Criticizes Emulation

Crosby criticized the practice of acquiring third-generation CPUs for emulation, which causes a "considerable loss in raw computing power."

The only way to recover this power is by program conversion, said Crosby, vice-commander of the Naval Supply Systems Command. He also said it is "self defeating" to have one programming group dedicated to both conversion of old programs and implementation of new ones.

When systems are being developed for many users, there should be one central design agency (such as FMSO) to save money, avoid the "not-invented-here syndrome" and have the advantage of dealing with one central agent.

"Dividing these tasks among organizations simply does not work," he said.

With current budget limitations, the Navy is required to show a profit for every piece of DP equipment before it is permitted to sign a contract, Crosby said.

Competing for funds during a "time of disenchantment with the military," the Navy must quantify that the "return will be greater than the investment," and "certify, in advance, that the payoff will be in hard cash, and will be reflected in reduced appropriations at the time promised," he stated.

### Paroles Get DP Supervision

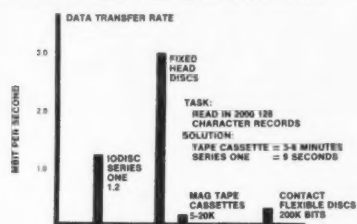
HARRISBURG, Pa. — The state Board of Paroles and Pardons plans to computerize supervision of all paroles under its jurisdiction.

The system is expected to speed communications between the board and the police and other law enforcement agencies.

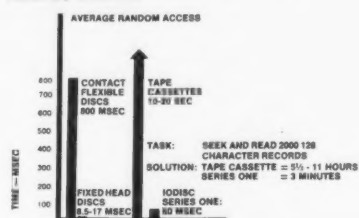
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At first glance you know that IODISC Series One isn't just another data storage system. It's stylish, incredibly compact and uses a unique, low cost 250K (byte) capacity Cartridisc which greatly expands the systems' off-line storage capacity. And better yet, Series One offers economy and performance that invites comparison with all other forms of data storage.

### IODISC SERIES ONE AS AN I/O SYSTEM



### IODISC SERIES ONE AS A RANDOM ACCESS SYSTEM

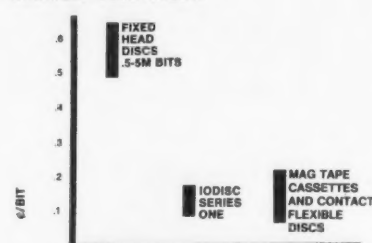


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## 'Foggy Data' on Forms

# Landlords Responsible for Delay in Rent Increases

By Molly Upton  
Of the CW Staff

NEW YORK — "Foggy data" has delayed approval by the New York City Office of Rent Control of increases to about 75% of the 1.1 million families living in rent-controlled apartments here.

Although the computerized system for handling rent increase applications was set up with error-correction procedures, this aspect of the program has proved more useful than originally anticipated. Instead "of perhaps 8,000 buildings, as we had figured, we've sent error correction requests to 43,000 (out of a total of 64,000) buildings," noted Robert Rosenberg, assistant housing administrator.

The "foggy data" came from faulty input by landlords. The forms "asked for a complex series of calculations made by the owners," acknowledged Rosenberg, and sometimes landlords simply filled in spaces incorrectly.

The forms require information from the landlord on such items as number of controlled and uncontrolled accommodations, approximate year of construction, number of work shifts of building staff and income from all sources other than residential rents.

On the back of the "Landlord's Report of Eligibility for Compensatory Rent and Labor Cost Adjustment" form, he is asked to perform a number of arithmetical calculations, such as multiplying the total weekly first-year increase by 52, multiplying total weekly second-year increase by the figure arrived at after subtracting 52 from "number of weeks from effective date of contract or from April 21, 1970, whichever is later, to Dec. 31, 1971."

Some spaces on the form allowed landlords to insert a couple of dates, such as 1920-1930, for information on the construction date, rather than clearly calling

for one year.

The landlord reports undergo extensive processing and checking, taking into account such factors as "senior citizen rent increase exemption" information. The maximum base rate is computed within a 7-1/2% limit.

"When we attempted to compute the maximum base rate, we produced either an MBR or an error correction request to the landlord saying he gave us some wrong information or didn't give it to us the way he was told to give it to us," Rosenberg explained.

But the landlord is not the only source of data used in these rent increase calculations.

"In processing the forms, the system picks up all the interim increases the landlord has gotten since 1970, like a history. It validates his old rent, the rent he was getting under the 1970 act. He makes those calculations, and we check

them for math accuracy, and also our original records to see that what he put in as his base rent was right. If he's wrong, we correct that on his MBR form," he added.

"The system validates what went on before, makes that adjustment, tells him any interim increases he got after that, what his MBR is, what he can collect this year. It also notifies him if he is ineligible for the MBR if he has defaulted under a number of conditions."

Rent increases on controlled buildings are granted only to those buildings that are on file as having met safety and health requirements.

"We are most of the way through cleaning up the data problems. A good part has been repunched and is back into the cycle," Rosenberg said.

The system used involves about 150 programs, and was developed in about a year.

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SUPERVISOR REQUIREMENTS	CCHAIN	CCHAIN, MPS TP
PARTION LEVELING	YES	NO
ASSIGNMENT RESOLUTION	YES	NO
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## Melbourne Studies On-Line Portfolio Analysis Service

Special to Computerworld

MELBOURNE, Australia — The Stock Exchange of Melbourne has introduced the first step of a plan likely to make it the only stock exchange in Australia with an on-line portfolio analysis service for investors.

The first stage began recently and will provide stockbrokers, institutions and the investing public with a cheap analysis of a portfolio containing ordinary shares quoted on the Melbourne market.

Batch processing is being used in the initial stages and the exchange hopes to have an on-line system by the end of this year.

With the present system, the stock exchange will sell portfolio analysis forms to clients. The client fills in information on the shareholdings and returns the form to the exchange for processing. A computer printout provides an analysis of the portfolio giving the company name (in order within industry group), description, percentage by value of portfolio, number of securities, market price, market value, dividend rate, annual income, dividend yield, earnings rate, price earnings ratio and net asset backing.

The client receives a summary page giving the group name, percentage of portfolio (by value), market value, annual income, and dividend yield as a percentage. All computer analysis is based on information effective at the close of the previous day's trading.

## National Industry Data Bank Possible

Special to Computerworld

ADELAIDE, South Australia — The State Government of South Australia is studying a report on the feasibility of a national information service for industry which could save millions of dollars in this country's export effort.

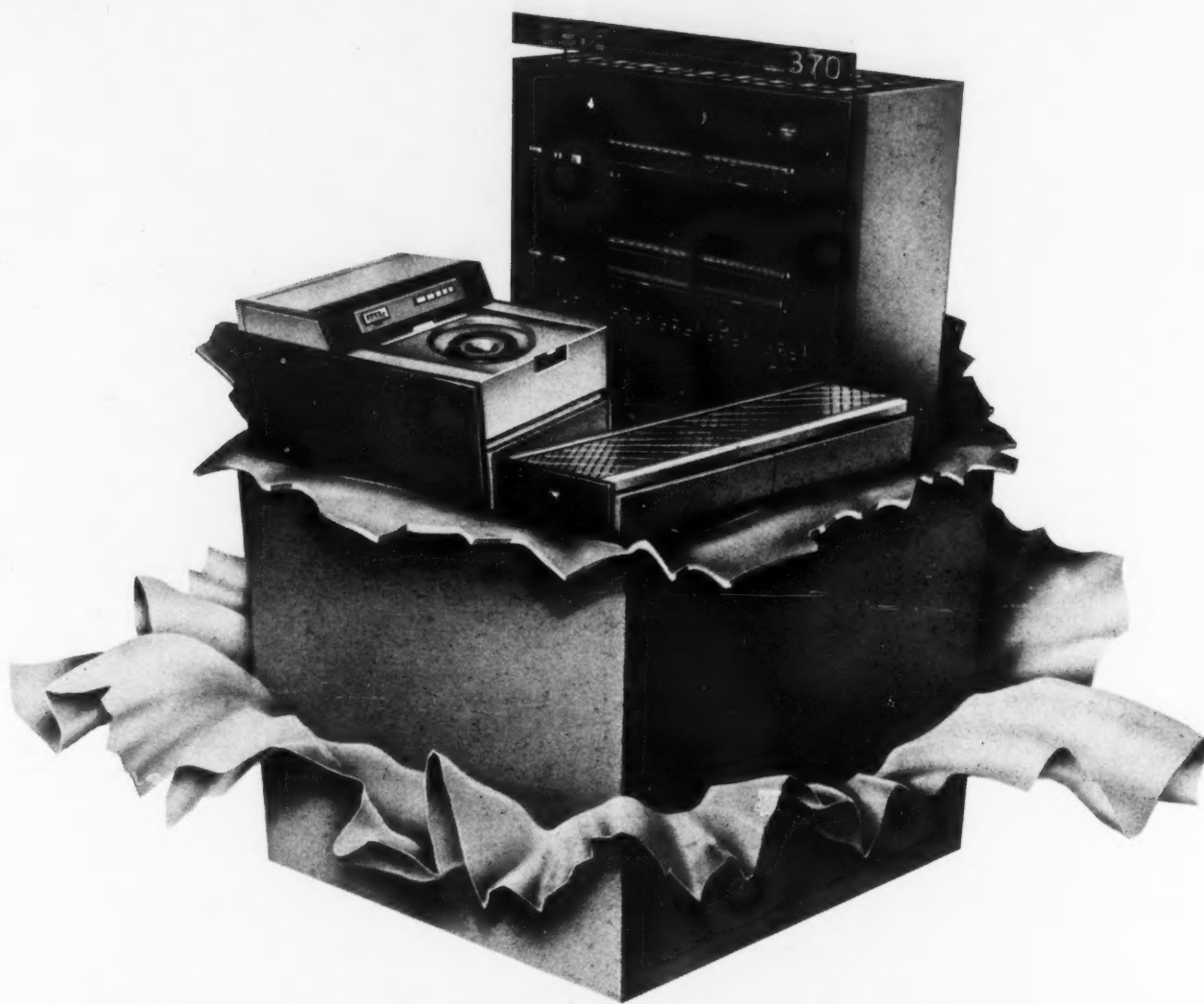
The Victorian Government is concerned with similar studies and the New South Wales Government is also said to be interested. The proposal calls for a state information center linked to a computer-operated national clearinghouse in Canberra.

The state and national centers would collect and disseminate information on a virtually limitless range of commercial topics including labor resources, company and operating regulations, cost benefit, business taxation and economic evaluations.

About 90% of the information for the service is already stored in one form or another, but it is haphazard.



# BREAKTHROUGH!



## ITEL'S unique new Packaged Lease Program may be the most significant announcement since the introduction of the 370.

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Present system \_\_\_\_\_

## Human Services Program Would Make Chattanooga's Needy Self-Sufficient

CHATTANOOGA, Tenn. — The City of Chattanooga has launched a computer-assisted human resources system to handle emergencies quickly and to help make the needy self-sufficient.

Mayor Robert Kirk Walker said the Human Service Delivery System will use the city's computer and a network of remote terminals to ultimately coordinate the services of some 70 public and private agencies, making vital services instantly available to anyone in need of emergency aid.

"But our program goes far

beyond quick response to financial or health crises," Walker said. "Once someone calls on us for help, he automatically becomes part of an outreach program through which counselors will show him how to attack and systematically eliminate, in many cases, the causes of his dependency."

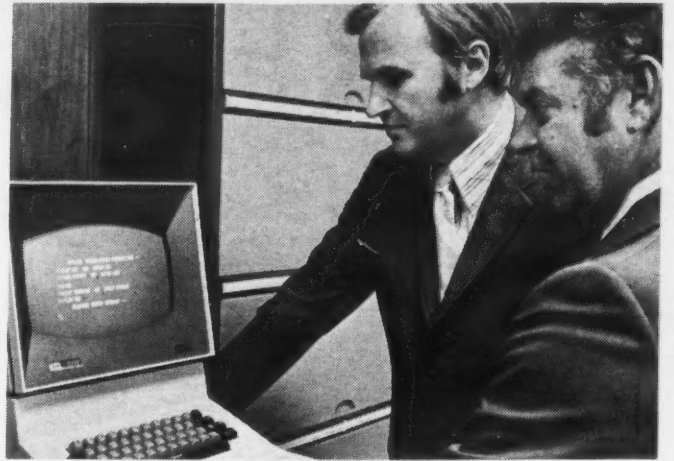
Another objective, the mayor said, is to do away with the overlapping of services, administrative tasks and support activities that cause unnecessary expenditures of federal and local

money and sap the agencies' effectiveness.

### 'Keep Same Records'

"Typically, social and health service agencies operate independently of one another, often keeping the same records on the same people and duplicating one another's efforts in many other ways," Walker said.

Under the system, an applicant visits one of the city's three neighborhood centers, describes his emergency need to a counselor and completes a short person-



Mayor Robert Kirk Walker (left) watches a demonstration of Chattanooga's new Human Services Delivery System by Robert L. Clapp, urban management information officer.

## A Special SJCC Announcement:

# IBM agrees to maintain 360 CPU's with selected Fabri-Tek extension core memory attached.

IBM has recently formalized by letter to Fabri-Tek a policy for continuing maintenance of certain 360 CPU's which have been modified by the addition of Fabri-Tek extension core memories.

IBM has inspected Fabri-Tek's alterations and additions to a number of 360 system types, and determined that continued IBM CPU maintenance is practical. System types inspected to date are as follows:

S/360 Model 22 to extend memory capacity to 64K;

S/360 Model 30 to extend memory capacity to 64K;

S/360 Model 40 to extend memory capacity to 448K;

S/360 Model 50 to extend memory capacity to 1 million bytes

IBM will continue to maintain these CPU configurations in the normal manner throughout the United States and in locations outside the U.S. where IBM has an existing service capability. IBM has further confirmed a willingness to inspect any new alterations of or attachments to CPU's not included in the above list, and to add them to approved configurations for service as they qualify.

## 24-hour service in over 125 cities.

Fabri-Tek 360-compatible memories are maintained by a network of more than 1,000 service representatives in over 125 cities in the U.S. These service representatives are employees of Sorbus, Inc., the contractor for 24-hour field maintenance of Fabri-Tek extension memories since May of 1971.

Fabri-Tek also provides a company field support

program for end-user memory maintenance. This support program functions with regional service managers and memory specialists deployed in key locations, and provides direct factory support to the Sorbus organization.

There are presently over 120 installations of Fabri-Tek 360 extension memories in the United States and Canada.

**See the complete line of add-on 360 core at booth 1210, SJCC Show—Atlantic City.**



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al profile form. The counselor uses a CRT terminal to quickly relay the information and the request for help to the IBM 360/30 computer at City Hall.

Within seconds, the computer supplies a listing of services from the selected agency to permit a plan of action to be initiated.

At the same time, another terminal in the neighborhood center automatically prints out a request for aid, including basic information on the applicant, which will be presented to the appropriate agency.

Within minutes, the needy person is on his way to the precise agency which can help him. And the city even provides transportation, if needed, from a fleet of radio-dispatched passenger vans.

One week after an initial encounter, the computer automatically produces an "outreach" report which reminds a neighborhood worker to visit the person for a counseling session. The city representative suggests aptitude tests, a physical examination and discusses the possibilities of vocational or educational training.

The final step — also prompted by a computer-produced reminder — is to help the needy person into and through an appropriate long-range self-help program.

"Coordination of services and aggressive follow-up are the lifeblood of our system," Walker said, "and we could never accomplish this without computer assistance and the experience of several years of innovation and learning in several of our major programs."

## Computer Finds 'Hidden' Crime

Special to Computerworld  
SYDNEY, Australia — New South Wales suffers far more crime than state governments and police have ever admitted.

Figures generated by a new police computer show this but do not necessarily reflect a great surge in crime last year. They reflect the efficiency of the system of recording reports, and the inadequacy of past methods.

The figures for the first 10 months of 1971 show the total of reported crime is likely to be 75% above the official figures of 1971.

Following the publication of the computer statistics in the *Sydney Morning Herald*, a detective sergeant who allegedly supplied the computer crime figures was suspended from the New South Wales Police Force.



# Now you have the best reason in history to buy E bonds.

Today's E bonds pay a bonus interest rate of  $5\frac{1}{2}$  percent compounded semiannually when held to a maturity of 5 years and 10 months. And they'll continue to earn the  $5\frac{1}{2}$  percent bonus rate as long as you hold them.

And if you compare E bonds with other ways of investing your money today,  $5\frac{1}{2}\%$  is a good rate of return.

Moreover, you pay no state or local income tax on the interest you earn on U.S. Savings Bonds.

Also, the Federal tax on E bonds may be declared annually or deferred, whichever you prefer. (Depending on your income, deferring payment of Federal taxes on the interest could be an advantage.)

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through your company's Payroll Savings Plan. You decide how much you'd like to save, and that amount is deducted from your paycheck automatically. If you have trouble saving money on your own, buying bonds through Payroll Savings is a way of

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Because U.S. Savings Bonds provide the money our nation needs to grow.

Buy bonds. Join the

Payroll Savings Plan where you work. You'll be taking stock in America's future, and helping your family's savings grow.

*A message from F.T. Cary, Chairman, Office and Computer Equipment Industry Payroll Savings Plan, 1972.*

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## Editorial

### Giving the Store Away

A criminal's best "accomplice" is the DP staff that listens to all the "scare" stories about embezzlements — and then does nothing to protect its own installation.

In one recent case, the payroll program made no provision for checking the status of employees before issuing checks. As a result, it was easy to get payroll checks issued to employees who were no longer with the school system.

In another recent case, accounts were marked "uncollectable" or removed from the files and the payments deposited in dummy bank accounts.

Both cases present a very strong argument for some sort of system certification program, such as those proposed by the American Federation of Information Processing Societies and the Society of Certified Data Processors. It is appalling that, after all these years, some systems still don't contain even the absolute minimum of checks and balances.



## Letters to the Editor

### How Many Firms Recognize Tech, Management Skills?

The article by A.M. O'Reilly, "All Project Team Members Must Be Professional" [CW, April 26], makes the excellent point that a successful project team must be comprised of "a known, proven set of skills."

He goes on to describe the ideal situation where analysts and programmers are well trained and experienced technicians; where users fully understand the ramifications and requirements of new systems; where management understands objectives, tradeoffs and costs; and where project control and documentation are well automated.

How can we argue with O'Reilly? But how many corporations recognize their technical and management skills, let alone take advantage of them? How many have complete, up-to-date job descriptions and skills inventories from which to select a solid project team? How many have well-planned and managed in-house training programs geared to skills requirements and system development needs?

How many have effective project control systems and project management training programs? How many have EDP career paths that are achievable and tied to accomplishment?

Our company, which focuses on EDP manpower development, has found few organizations that can answer these questions affirmatively.

We employ our "Total System for EDP Training and Career Development" to enable clients to define their skills requirements, take stock of existing skills (for operations, systems, programming and management), identify their training re-

quirements and priorities, develop job descriptions and career paths geared to the organization, and build an in-house training program geared to systems plans and specific needs.

The valuable and costly resource known as EDP personnel must not only be well structured and managed to attain the goals of corporate management, but must also be fully understood, well oiled and constantly maintained to achieve the working level described by O'Reilly.

Lawrence K. Grodman  
President

Q.E.D. Information Sciences, Inc.  
Wellesley Hills, Mass.

### Reader Questions Operation Of Detection Equipment

You're putting me on! Page 13 of the April 5 issue mentions a DPMA letter to its membership claiming that detection equipment is equipped to "determine any interruption in the earth's field of gravity between them, by any object made of ferrous metal."

Can you please explain how the equipment operates? I believe you owe it to your readers to convince them that this airport probing is indeed harmless.

Roger C. Brown

Copley Newspapers  
La Jolla, Calif.

Visualize passing through two compasses three feet apart carrying a gun made with a pound of iron. Ed.

### Telex Tape Subsystem Delivered in November

We appreciate the article by Frank Piasta in the March 29 issue discussing

Telex.

Mention was made of the Telex 3420-equivalent tape subsystem, describing it as relatively new and about to be delivered.

It is a fact that Telex delivered to a customer its initial 3420-type subsystem in November 1971 and has been in full-scale production of this subsystem for a number of months.

The subsystem, it should be stressed, is totally "new" generation in that it employs true radial technology, digital interfacing, microprogrammable controllers and offers full device-switching capability — it is not a "repackaged" 2420-type subsystem.

Michel T. Murphy  
Director of Sales

Telex Computer Products, Inc.  
Tulsa, Okla.

### Dataprint Qualifies

Your four-part series on output techniques [CW, April 5-26] gave us a large measure of satisfaction in its furtherance of education in computer-controlled off-

line printing as an economical and efficient method of operation.

However, we are somewhat mystified at the lack of mention of our CMC 36 Dataprint system, which meets all the economic and technical rationales outlined in your review. Dataprint is a computer-controlled, modular system that can run one or two 1403s, multiple tape drives, and can be configured to meet user needs.

In spite of our concern at not being included in your article, we are pleased that your consideration of the subject lends credence to off-line printing having come of age.

E.R. Williams  
Vice-President, Marketing  
and Support Services

Computer Machinery Corp.  
Los Angeles, Calif.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

## Effective Analyst Must Acquire Not Achievement, But Growth

By Thomas W. Doctor

Special to Computerworld

My description of what is required to become a truly effective business systems analyst in our business world:

### The Effective Analyst

(Adapted, in part, from Eric Trist's keynote address to The Town Planning Institute of Canada, June 1968.)

## Viewpoint

He knows to be effective he must acquire . . .

Not achievement, but growth;  
Not self-control, but self-expression;  
Not independence, but interdependence;  
Not endurance of stress, but capacity for joy.

He knows he is most effective in an organization that has . . .

Not mechanistic forms, but organic forms;  
Not competitive relations, but collaborative relations;  
Not separate objectives, but linked objectives;  
Not resources absolutely regarded

as owned individually, but resources regarded also as the company's.

He knows he is most effective when his strategy (and that of his company) is one that has shifted . . .

From responsive to crisis toward anticipative of crisis;  
From specific measures toward comprehensive measures;  
From requiring consent toward required participation;  
From short planning horizons toward long planning horizons;  
From damping conflict toward confronting conflict;  
From detailed central control toward generalized central control;  
From standardized administration toward innovative administration;  
From separate services toward coordinated services;  
From passive planning toward active planning.

As you can observe, the effective analyst need not be a business systems analyst per se, but anyone who "thinks for a living." More important, however, are the obstacles in business that prevent each of us from becoming as effective as we know we must be in order to progress profitably, professionally and personally.





# Independents Could Hold Customers By Stressing Informed User Approach

Recently, I commented that the independent peripheral manufacturers have made some inroads. But the question is whether or not this was inevitable — the independent computer industry capable only of parasitic existence and no true independence?

An approach that can often be taken to check out the viability of independents is to look for any basic weaknesses in the IBM position.

The main one, and the one that most concerns us, is the way current policies dictate that IBM treats its users like babies, rather than responsible adults.

Because users are used to this treatment — and have never known anything better — IBM can claim its users must take

final responsibility for the operations of the hardware.

IBM can, however, get away with designing equipment, without revealing the information necessary to make users capable of adequately controlling their own affairs.

## Inadequate Interfaces

Typically, the design of IBM peripherals includes many interfaces which are inadequate — from the user point of view.

The SCDP Technical Committee, for example, recently pinpointed the design of current tape drives (including the IBM tape drives) as being the prime cause for the failure of tape quality!

Because U.S. computer installations are unable to measure the quality of tape, the tendency is to buy by price alone.

As a very natural result, the overall quality drops — as we have seen tape quality drop over the past two years.

Another problem area involves the design of tape controllers that conceal the occurrence of

error conditions or of modifications being made to user records.

In both cases the result is that the supposedly responsible user is deprived of the information he needs to act on his own initiative — and must remain just a puppet.

There are other cases where the IBM engineering design and maintenance practices have kept both useful and really essential information from their users. Keeping users ignorant strengthens IBM's hold over the market. But once users are educated, such a policy can be a real weakness.

## Outdated Philosophy

Because the independents have adopted this outdated IBM philosophy and continued to ignore the needs of their users, have so far failed to convert IBM's policy into strong points which could make the independent peripheral and mainframe industries genuinely independent.

In one recent case, however, there seems to be a change, and the independents are showing



Neal Peterman, General Peripheral's vice-president of engineering, shows Alan Taylor the changes being made in the PGI Universal Controller microprogram to allow the Media Examination facility to be provided so that users can check the quality of their disk packs at their own site. In the background is the rack-mounted engineering model of the PGI controller which was having its program modified to test out the function.

initiative. The new 2314-style drives have the capability of both running ordinary, double and quadruple data density.

From the user point of view these increased capacity disk drives are definitely an advantage, as they provide more capacity with little increase in cost. IBM does not offer increased density drives to its 2314 users; only the independents now offer it.

## Media Quality Problem

Until now users have had problems with these drives. The testing procedure of the completed 2314-style disk packs when they are manufactured does not guarantee all the positions used by the new drives are properly tested!

And the disk drives currently available do not include the

It seems that Peripherals General's approach is an example other independents will find worth following. The approach serves the user, and that is the real reason why I want it to be followed.

However, from the purely selfish point of view of the independent peripheral manufacturers there is the equally good reason the informed user approach could break IBM's true monopoly situation, their 100% second-source monopoly?

Once users discover how useful engineer-designed user aids can be on their disk drives — they will ask for them even if this means choosing an independent. Before they ask IBM!

The users' second choice will tend to become someone else who can also provide these needed user facilities.

*Currently, the user cannot get the information he really needs, either from IBM or from anyone else!*

capability of testing a pack to find out whether the particular pack is — or is not — really suitable for the additional data.

Currently, the user cannot get the information he really needs, either from IBM or from anyone else.

Indeed, hardware salesmen are inclined to inform prospects they can simply continue to use the 2314 packs they have — without mentioning that troubles may — and may not — occur at a later time.

Normally, 2314 packs are, in fact, adequate. There is a sufficient number of cases, however, where this is not so — and where the user cannot tell the difference between an acceptable and non-acceptable pack. He can run into unexpected and unprepared-for trouble.

Users do not like unexpected and unprepared-for trouble, no matter how minor. The genuine advantages of increased capacity drives may be lost — together with some part of their confidence in the independents.

## Independent Gives Information

That situation should not occur in the case of the new Peripherals General increased capacity disk drive. Its users will be able to test packs because a test capability option is being built into the drive.

Users will be able to know with certainty where they are backed with solid information if packs have to be replaced or refurbished.

# How to Push 'Experienced' Schooling

One of the advantages of the Furr Challenge Cup, offered to the best data processing school in the country, is that different questions arise and must be considered.

Sometimes they are minor questions, such as whether or not an alumni association can enter a school — and sometimes there are major ones, such as what a school is.

Alumni associations definitely can enter the contest. In fact, there is more interest among alumni associations than schools!

There seems to be a good reason for this. The school runs into all sorts of "political" situations in entering such a contest, whereas the alumni association can only increase the stature of its members by entering.

It is not involved in the political arguments — so if you are an alumnus... "yes, you can certainly act on it."

The question, "What Is a School?", came from a systems analysis teaching organization. The particular organization is Ware Associates of Hudson, Mass., which runs a post-graduate course in systems analysis every month for Aetna Life and Casualty in Hartford, Conn. It has trained many students, and feels it has done some good work. But does that make it a school within the meaning of the challenge?

The situation is actually more complex than it originally appears. This was well exemplified by a chart of courses that Ware Associates puts out.

It shows considerably fewer courses listed for a trainee systems analyst than those listed for an experienced systems analyst.

When you come down to it, this is a straight statement that in fact post-experience education, as well as entry-level education, is a necessity. Entry level can provide valuable people, but experienced people also need updating and broadening.

The problem has often been obscured by the fact that while entry-level education, both at private schools, two-year colleges and four-year colleges, is available, experienced education is not generally available. There are not many people in the industry who can take the time off to do a one-year sabbatical study, and so the format of most school curricula simply does not lend itself to experienced education of people in the DP industry.

## Taylor Updates

There is also considerable doubt as to what such studies should consider in detail. For instance, while reading one curriculum for a one-year systems analysis course run by Twickenham Technical College in England, I found that it mentioned that one of the items the students would be studying would be what they should be studying! (Don't laugh — I think it is one of the most productive approaches I can see — for a 1972/73 one-year course).

But the real problem is that many experienced people do not have a year available.

The question, then, is how to best encourage the "experienced" schooling as it seems necessary. Ware Associates is currently providing a one-week training period, with the students taking appropriate selections out of a fairly large menu of modules.

This way the individual students can expect to get in their one week as much as they would be able to get in a two- or three-week generalized course. This productivity results because the student always has certain backgrounds which may make some course unnecessary, and always has some needs which may make certain courses particularly interesting — and this encourages him to work exceptionally hard!

It is an interesting approach which has been used to train many experienced people. Whether it works, of course, I really do not know yet.

In addition, Ware Associates is now introducing another concept, that of an open public course. This may not be entirely original, because there have been intensive seminars put on by people like Brandon Institute and AMR for some years.

But can a public course be modular and effective? I do not know, but if it can be — and if Ware Associates has done it — this type of achievement could be even more important for the DP profession than the entry-level courses that are all Coleman College is offering. So while this may not fill most definitions of what a school is, I think it is one definition. And Paul Salcido, chairman of the judges for the contest, agrees with me that such an operation should not be excluded from competition for excellence.

So welcome to the Furr Challenge Cup Contest, Ware Associates. Your pioneering work may be rough, but it may be able to do more for the DP profession than the polished work of others.

And that is the contest criteria being used to determine what a data processing "school" is — anything that helps the profession by passing on knowledge and experience through formal instruction to students.

And welcome to a Furr Challenge Contest anyone else who feels they are making an advance in practical training and DP education. The rules are printed in the March 29 and April 26 issues. Just let Paul Salcido know you intend to join and he will get the papers to you.

So you can see that in the Furr Challenge Cup Contest, as so often in data processing, there are unexpected benefits.

Isn't that such a normal part of DP that it should be included in our planning.

And that could be the key for real independent viability. All the signs are that such provision of user-oriented facilities will be supplied much more effectively from the independent industry than from IBM.

This is an interesting concept because it suggests the key to the health of the U.S. independent computer industry will be found in looking after the customers' full interests — instead of just providing Chinese copies of inadequate IBM products.

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## Computer-Plotter Combination Expands Power Shovel Design Engineering

By George Thompson  
Special to Computerworld

PITTSBURGH — Advantages effected by computers have now been harnessed to extend engineering capabilities in designing and manufacturing key structural and mechanical parts of draglines, a specialized crane used in strip mining, and power shovels.

Performance curves that normally take from one-and-one-half to two hours of an engineer's time are now done electromechanically in minutes, and drawn by a plotter within 15 min. Diagrams of shaft stress and deflection are provided in as little as an eighth of the time usually needed for hand calculations. From existing computer data, a three-dimensional view of any drafting projection can be made of any structure to be analyzed.

A recent front-end design for a shovel, which incorporated over 300 load versus position calculations, for example, would have taken six months to complete before the computer-plotter was installed. This job recently took just two hours in the computer room.

Our engineers have used the plotter for about a year, and

have found it to be a tremendous timesaver.

### Varied Uses

Common uses we have found for the computer and plotter combination include: computerized mathematical analysis of structures; simulation of digging conditions encountered by draglines or shovels and performance curves which are provided in sales presentations.

Also, gear-tooth profiles to an accuracy of  $\pm 0.0025$  in.; diagrams of the walking step on a walking dragline; shaft deflection and stress diagrams; gear durability curves; analysis of geometry on large stripping shovels or on mining/construction size shovels; and many XY or XYZ plot-charts in forms necessary for engineering analysis.

Our engineers are preparing engineering work load Pert diagrams and are planning an extensive programming effort for mining application studies using the computer-plotter.

### Graphic Drawings

In designing booms, for example, the engineer roughs out a sketch of the structure and from experience provides a first trial of member sizes. The computer then supplies member properties (area, moment of inertia, etc.); joint coordinates (intersection of two or more members); member lengths and weights; joint weights; and polar moment inertia of machine, boom and swing force loadings. This data is provided to the engineer in printed readout form while feeding it to another computer program. The engineer is also provided a complete set of drawn views of the structure.

Within minutes, this plotter picture has presented the designer with a graphic drawing of what he is attempting to design and also enables him to discover errors that may exist in the data cards. By reviewing the picture

of the structure, he can determine its accuracy.

After the engineer contributes other required load data, the complete structure is analyzed through a program which supplies all the loads—including internal redundancy—in all the members. A normal calculation may include seven to nine loading conditions over a structure composed of 275 members.

These loads are then scrutinized member by member for the dominant conditions. When these are identified, the computer provides various alternate factors of safety. At this time the engineer decides if the factors are satisfactory. If even one is not, he reevaluates the size and returns to the beginning of the procedure.

### Balanced Structure

Thus, the design program for this boom analysis allows the engineer to produce a balanced structure. This means a lighter piece of equipment with weight distribution proportional to its maximum function, thereby producing a dragline with higher production capability for the customer.

An actual comparison study has been made of a boom design system with and without a plotter. Without this tool, our engineers spent six to 12 hours manually reviewing the punched cards to verify the accuracy of the data. Then the data was applied to the computer for structural analysis. The computer revealed manual scanning required more careful attention to detail, and therefore, the engineer had to rerun the data and lose valuable time. Now, with the computer, most errors can be located and corrected within 10 to 15 minutes.

G. Thompson is development engineering manager at Marion Power Shovel.

Coming in the June 28 issue of *Computerworld* is a special supplement on

## Software and Measurement

In this supplement, our editors will examine the current state of the software field, including:

- Improving CPU productivity through efficiency measurement packages.
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- New software support to RCA's Spectra users.
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## The Professional's Viewpoint

# Grass Roots Want CDP Exam Questions Updated

By Mike Ingram, CDP

In response to a questionnaire in *Computerworld* earlier this year [CW, The Professional's Viewpoint, Jan. 26], the professional grass roots expressed very frank comments about the CDP exam. Topping the list of suggestions were:

- The CDP exam must be kept current by constantly updating the questions.

"The Professional's Viewpoint" is prepared by the Society of Certified Data Processors in conjunction with the editors of *Computerworld*.

- "Non-relevant" education should not be counted for possible exam entry requirements.
- A broad background is preferred over specialized skills in satisfying exam entry requirements.

ments.

Who are the grass roots? In this survey, there were 188 respondents to the Professional Viewpoint Page questionnaire — 20% were CDPs and 11% were SCDP members.

Here are the questions and their responses:

**Should the CDP examination be made more difficult?**

13% Yes — Indefinitely.

1% Yes — Until 19XX.

19% No — It should stop as it is.

59% Other (23% says the exam must be updated and kept current with today's EDP technology; 18% is unfamiliar with the exam and could not answer; 6% says that "difficulty" is not the exam criteria — the exam should be judged on its ability to reveal knowledge and competency; and 12% represents all other responses.)

The heavy write-in vote to keep the exam current is most significant. Although slightly more readers favored increasing the difficulty of the exam (versus leaving it as is) there were significant comments discouraging "difficulty" as exam criteria and favoring the validity of the exam in determining a candidate's knowledge and competency. For example:

"It should 'keep up' with industry. This might seem like it is getting harder to those who don't 'keep up' themselves." — Lewis Halprin, Lexington, Mass.

"Make the exam reflect competence in step with the state of the art." — Peter Akwai, Milford, Conn.

**Should education in "non-relevant" subjects be counted?**

14% Yes — Ignore any difference in different academic training.

52% No — Allow DP education to substitute for some experience required for entry to the CDP.

6% No — Allow DP education to substitute for all experience required for entry to the CDP.

29% Other (12% favors some combination of education and experience; 5% says that only "specialized" education should count; 3% favors dropping the education and for experience requirements prefer instead to use the test to judge practical knowledge; and 9% represents all other responses.)

The above results are much in favor of not counting "non-relevant" education in meeting CDP entry requirements. The results raise another question of how much DP education should substitute for experience. Some suggestions were one year of education for one year of experience, or a DP-related degree plus two or three year's experience. For example:

"Allow data processing education and other relevant topics to count toward experience." — Jo Rose, Boise, Idaho

"Allow education in other fields... but assign less weight to it." — James J. Ugrin, Skokie, Ill.

"Doctors don't become doctors by majoring in computer sciences... why should the computer field be different?" — Demetri Steart, Reston, Va.

**Should "broad background" be favored over specialization?**

20% Yes — Use entry requirements to ensure CDPers have broad background.

34% Yes — Retain the current broad examination to ensure CDPers have all-round knowledge.

11% No — Retain the current method of experience alone allowing entry to examination.

14% No — Provide a number of specialized examinations for specialists to take.

21% Other (11% favors some combination of broad and specialized exams or just specialized exams; 10% represents all other responses.)

The responses to this question favor a broad background over specialization. Note the heavy

vote, however, for some form of specialized exams which were labeled "software programmer, systems analyst, etc." For example:

"Both the entry requirements and the nature of the exam itself should be developed to insure the CDPers have a broad background of experience and knowledge." — Douglas Anderson Jr., CDP, Fairfax, Va.

"The certificate holder is certified as a data processor and not a hardware or systems expert." — John C. Cooper, CDP, Lansdale, Pa.

Our thanks to the many contributors who answered the questionnaire. As a result of the study, a policy statement reflecting the significant conclusions of the survey is being advanced through the Society of Certified Data Processors.

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If you *really* need *simultaneous* copies of your computer printout, we can't help you. Because as efficient as electrostatic technology has become, there is no way to get more than an original copy out of our printer.

You have to stick with an expensive impact printer.

But if you just need occasional copies—and there's an office copier close by—then read on.

You're about to find an answer.

## Even at comparable prices, electrostatic printers have an edge.

When we were planning to fill the product vacuum in the 500 to 600 lpm range, we never had to think twice about employing the electrostatic technology.

For one thing, it is the only *natural* mate to a computer. Since our Matrix printer has no moving parts (except in the paper transport), the computer can talk electronically right onto the paper—without passing through a maze of wheels, gears, pins, and pounding keys.

The few moving parts eliminate most adjustments, alignment, and calibration, while increasing dependability.

Noise is practically non-existent. By contrast, impact printers beat out 89 to 94 dB in most EDP areas. Deafness can be caused by repeated noise over 90 dB.

Paper costs, once high, are plummeting downward. Today, electrographic paper in quantity purchases runs about 1.3¢ to 1.7¢ per sheet. And the price continues to drop.

*But mostly, the technology indicated that really low-cost printers were possible. Now with development costs out of the way, we are proving the truth of our early speculations.*

## Our long-range plans are paying off.

Versatec is now prepared to take on the noisy impact printer market with printer and controller prices that can't be matched anywhere.

Our Matrix LP 860, with 600 lpm, 80 columns wide, 64 ASCII characters, and 8½" fan fold paper, will cost you just \$3900 *in quantities of one!*

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Optional 96 ASCII character operation is available for both models at *no reduction in printing speed.*

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This is the same family of electrostatic printers now in use throughout the world. Backed by a 3-year-old company with sales and service offices in the U.S., Canada, 12 European countries, Israel, Australia, and Japan.

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## Random Notes

### Software Supports RCA Programs Under OS/360

NEW YORK — Users who have been emulating an RCA 501 on Spectra 70 equipment but are now considering a move to IBM 360/370 will be able to keep on using their second-generation programs under the RCA 501 Simulator package from Software Design Associates Inc. (SDA).

The package is said to support all RCA 501 instructions and all devices except paper tape. Communication with the simulator is handled through JCL, avoiding any need to modify the 501 programs.

The package runs under OS/MVT or MFT and requires 100K bytes of core. It is available for purchase or on lease plans, under which it costs \$2,000/mo to \$3,000/mo.

SDA is at 18 East 41st St., 10017.

### ADR's 'Spacesaver' Feature Shows Utilization of Files

PRINCETON, N.J. — The Librarian Spacesaver, a disk management reporting system, has been introduced as an option to the basic Librarian System by Applied Data Research, Inc. (ADR).

Reports generated by the feature are designed to help IBM 360/370 OS users optimize utilization of disk storage space. It is available for \$900 on a permanent license, including two years of maintenance. The Spacesaver is the first option offered with the Librarian source program retrieval and maintenance system since its introduction in 1969. ADR is at Route 206 Center, 08540.

### Shareholder System Extended

NEW YORK — GTE Information Systems has a significantly enhanced version of its Corporate Shareholder System (CSS), a software package marketed by Programming Methods, Inc. (PMI).

The new features include a complete dividend reinvestment program, a "transaction-level" balancing option, and the ability to print "two-up" dividend checks with a combination check/1099 in the fourth quarter. Additional features, such as "two-up" proxies and variable stock pricing on fractional splits with buy/sell options, are also available.

Prices of these options range from \$500 to \$2,500 and can be installed within two weeks of order date. The base price of CSS is \$25,000.

PMI is at 1301 Avenue of the Americas, 10019.

## Packages From Texas

# Streams Simulated to Study Quality

By Don Leavitt  
Of the CW Staff

ATHENS, Ga. — A pair of simulation programs designed by the Texas Water Development Board for stream quality studies are now available as low-cost packages from Information Services here, or through a terminal system administered by Boeing Computer Services for the Environmental Protection Agency.

Dosag-1 can simulate the spatial and temporal variations in biochemical oxygen demand (BOD) and dissolved oxygen

concentration (DO) under various conditions of temperature and headwater flow. It principally is used for rapid evaluation of a number of varying stream conditions.

Qual-1 is designed to simulate the spatial and temporal variations in water temperature and conservative mineral concentration as well as BOD and DO. The program is more flexible and more accurate than Dosag-1, but both are needed to properly analyze a complex stream or canal system, according to EPA spokesmen.

The Dosag model calculates the BOD/DO at specific points in a stream system. If desired, the minimum DO in a stream may be compared to a predetermined DO level. If the DO is too low, the model will compute the amount of flow augmentation required to bring the DO up to the desired level.

Qual-1, on the other hand, takes user-specified parameters and routes them through a series of streams or canals on an hourly basis. The program begins the routing calculations from the point farthest upstream, and modifies the formulae as waste discharges, withdrawals, tributary flows and incremental runoffs are encountered.

The result is a set of simultaneous equations equal to the number of computational elements in the system. Qual-1 solves these equations and repeats the procedure until steady-state conditions are reached.

Each of the packages can be run, with minor modifications, on any CPU with a Fortran IV compiler. Dosag-1, with approximately 1,100 source cards, costs \$350, while Qual-1, with 2,100 cards, costs \$450. Documentation, in each case, is additional.

Information Services, an outgrowth of the Cosmic clearinghouse for government-developed software, is at 112 Barrow Hall, University of Georgia, 30601.

## Modules Add Internal Security, Audit Trail to Systems, Files

LOS ANGELES — Users can guard against embezzlement, malicious damage or inadvertent mistakes on their 360 systems with the Internal Security software system from Associated Computing Services Inc. (ACS). Versions are available for either DOS or OS, the company said.

The system is a set of modules which can be linked together to provide the security desired by the user. Some of the subsystems prevent unauthorized activities; others provide audit trails for changes.

One of the modules, for example, prevents unauthorized use of the computer itself. Another blocks additions, changes, renaming or deletions to the operating systems unless they have been approved.

A third module is said to prevent a program or system from being altered or stolen, and a fourth prevents access to sensitive data, by storing data on tape or disk in scrambled form so that even a standard printout of the file would be unreadable.

More positively, the system can note the exact date a program has been cataloged, changed, renamed or deleted. This facility enables an auditor to verify that a production program has not been changed,

or to identify the exact instruction or instructions that have been altered.

Some of the features do require modification of IBM's operating system, and in those cases where IBM refuses to maintain the altered system, ACS will do it for the user, a spokesman said.

Written in Assembly Language, the system utilizes B-transient type logic and requires 10K bytes maximum. It is priced at \$7,000/module with an undetermined discount for purchase of the entire system. Lease plans are available.

ACS is at 12011 San Vicente Blvd., 90049.

## Neat/3 Translated Into Cobol

DAYTON, Ohio — NCR Century users can translate Neat/3 source programs, level I or II, into NCR or ANS Cobol, with Neatbol from Du-Com Inc. Conversions are said to be 92% to 98% complete, with diagnostic messages marking those statements that cannot be handled.

The problem areas appear to be known to the developer and documentation is provided so that users are aware of them

before attempting a translation. Commands using Mode 3 indexing or index registers that have an untranslatable area association, for example, are not handled.

The package will, however, substitute acceptable names for Cobol reserved words in the Neat/3 program, and it will generate field names for records, areas and table items that have no data name in the original.

It attaches indexes and OCCURS clauses to table items and inserts entire blocks of Cobol code to simulate Neat/3 table commands.

Options under Neatbol include the addition of a byte when translating packed unsigned fields of the K type into packed signed fields, such as Comp-3. It can convert all files with variable-length records to fixed-length records, retaining the variable-length indicator for program record analysis.

Purchase prices for Neatbol are based on the largest Century configuration installed at the user's installation, and range from \$4,000 for a Century 50 to \$8,500 for a Century 200. Du-Com will also provide Neatbol capabilities on a service basis, for 20 cent/Cobol output card.

The firm is at 1801 East First St., 45403.

## Rapidata Extends T/S Services

FAIRFIELD, N.J. — Rapidata Inc. has implemented a trio of capabilities designed to give users of the time-sharing service more flexibility. Basic, already extended beyond the original Dartmouth language, has been further enhanced.

In addition, the company has made available a report generator and a financial modeling system, neither of which requires strong DP experience to be used effectively, a spokesman said.

Support of scratch files and the ability to create, rename and "unsave" permanent files are among the features added to Rapidata's Basic. Accounting functions to report terminal and CPU usage are also included, he noted.

Financial modeling is possible with the Data Evaluation for Management Decisions (Demand) system. A model in Demand consists of a logic module which contains definitions of variables and their interrelationships. Demand includes a library of predefined models, but also allows the user to build his own.

Statistical methods available to evaluate the models include sensitivity analysis, probability distributions, future assumptions and serial correlation.

Rapidata service is available on an In-Wats basis throughout most of the eastern U.S. and along the West Coast.

The firm is at 20 New Dutch Lane, 07006.

## IS YOUR COMPANY MAKING A MISTAKE?

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## Standard Practices Help Both Buyer And Seller of Excess CPU Time: TBI

ELMSFORD, N.Y. — Selling excess computer time can be an important secondary function of a DP installation and can add tremendously to the profitability of the seller's installation.

But, warns Time Brokers Inc. (TBI), the computer center should be treated as a profit center and it should be justified by its primary function alone, and not "bailed out" by selling time.

Time sales have become common enough so that TBI recently developed guidelines as aids to both buyer and seller. With such rules, companies can decide whether or not they are likely to be successful, even before they make the decision to sell time.

An important factor in determining the amount of excess time available for sale is the effectiveness of the DP management in scheduling internal jobs. Beyond that, each seller faces a "unique market" situation, depending on his hardware and software configuration, his location, and the way he operates his installation, TBI said.

The vast majority of sellers price their time based on the number of hours and minutes the buyer has possession of the equipment, regardless of how much meter-time is used.

Generally prices rise as computing power, core size, number of peripherals and internal speeds increase.

Price quoted for a given configuration normally includes all components even if they are not used by the buyer's program. Prices tend to vary, however, from prime time, to second shift, to weekend "bargain" rates, the company added.

Third shift time is hard to sell, even when the price is only half of the prime rate, TBI warned. Third shift time is best used for in-house jobs of a low priority, a spokesman for the firm suggested.

Traditionally, time buyers run their own jobs and have complete responsibility for time used on the computer. Only in case

of machine malfunction will charges be waived.

This pattern holds true even when the seller provides an operator to process the buyer's work.

### Multiprogramming Problems

Such "traditional" approaches work well in stand-alone processing, but it is often difficult to determine responsibility in case of "bomb outs" that occur in multiprogramming environments. Whether charges should be applied in these cases should be determined on a case-by-case basis, TBI said.

Both buyer and seller should be clear about rates, configurations, and when time is to be used, when they negotiate for a time sale. Beyond such basics, however, they should also consider which party provides the operator, paper and cards, and scratch tapes and disks.

Copies of a standard contract between buyer and seller, as well as copies of the *Uniform Guide for Computer Time Marketing*, are available free from TBI, 500 Executive Blvd., 10523.

## 'MAS' Watches Patient Care

DAYTON, Ohio — Hospitals with Century CPUs can monitor, on a weekly basis, the quality of care being given patients with the Medical Audit Statistics (MAS) package now available from National Cash Register Co.

The MAS reports are said to exceed the requirements of the Joint Commission on Hospital Accreditation. The package was developed through joint studies conducted by NCR and the Medical College of Georgia.

MAS produces patient census, bed utilization and other reports needed by hospital management. Beyond that, it lists those patients failing to receive minimum standards of care, and generates long-term statistical profiles showing the distribution of patients receiving sub-standard care, by diagnoses.

The program allows a hospital to establish its own standards and then measure the quality of care each patient receives compared with those norms.

Since the program only reports the sub-standard situations, the hospital staff knows immediately which patients need attention, without wading through excessive printouts.

MAS, written in Neat/3, requires at least a Century 100 with 16K memory, dual disk unit, printer and card or paper tape reader. If the hospital chooses to maintain the JCHA index files, 32K memory and two tape units are also needed.

A 400-bed hospital can run the basic MAS program in four hours per week.

The package is being distributed without cost to users.

## Another Westinghouse breakthrough: The COBOL Programmer's Tool Kit. At a commonsense price. Six timesaving aids. \$4800.

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## Plotting Package Aids DP Novices

CARSON, Calif. — Many plotting packages are available as subroutines to be CALLED by user-written programs, but Fasplt from Verified Software Products Co. can be used directly by engineers or businessmen without extensive DP experience, the company said.

The package functions with minimum control statements and accepts plot data from punched cards, magnetic tape, disks or drums. It can also work with data as it is generated by user-coded application programs, a spokesman noted.

It runs in two modes. In Automatic mode, it produces a set of plots, one for each user data variable, with as little as two control inputs. In General mode, the package can produce a plot having up to five curves, each with a different symbol placed at selected data point intervals, and having five annotation lines, a legend and a company logo, he explained.

Fasplt is operational on Univac 1108 and IBM 360 where it is reportedly producing report sized plots in less than two seconds, while using 120K or fewer bytes of core.

The package drives Calcomp, Zeta and Complot plotters and "is designed to be compatible with any other plotter or printer/plotter," the company said.

Fasplt is available at \$115/mo with a one-year lease, from 942 E. Gladwick St., 90746.

## Insurance Illustrations Produced on T/S Network

STAMFORD, Conn. — The Insurance Sales Support System (ISSS), which generates sales illustrations for life insurance prospects, is available on a time-sharing basis through National CSS Inc.

It can show on a year-by-year basis the costs of the proposed plan, its benefits, tax advantages and estate values and other practical data useful in sales presentations, National CSS said.

ywell UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell
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ywell UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell
ywell UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell

**If you think  
computer manufacturers  
have all the answers in data entry...**

**you don't have all the  
answers.**



UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell	UN
UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell	UN
UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell	UN
UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell	UN
UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell	UN
UNIVAC	Burroughs ⊕	IBM	N	C	R	Honeywell	UN
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**Who do you think would introduce the first  
4800 bps multi-point modem that equalizes itself?  
Codex, the people who made high-speed modems  
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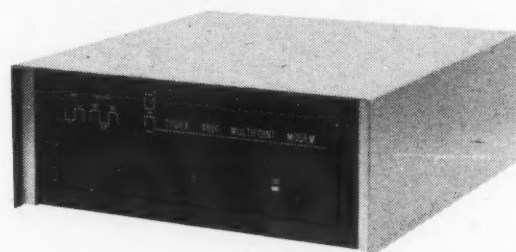
While everybody has been trying to develop a reliable high-speed modem to compete with our new Codex 9600 bps, we've been busy with other things. We're now ready with the first automatically equalized 4800 bps modem for use in multi-point polled networks.

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The auto-equalization time of the Codex 4800 multi-point modem is within 50 milliseconds, savings are significant and costly delays are eliminated. There is no time off the line, throughput is greater and terminals can be polled more frequently resulting in faster response time.

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## Data Briefs

### Vadic Has Bell, IBM Compatible Data Sets

PALO ALTO, Calif. — Vadic Corp. has announced an IBM- and Bell-compatible modem that will operate asynchronously at speeds from 134.5 to 1,800 bit/sec.

Designated the VA1601/2, the unit contains card slots to hold two Bell-type modems or two IBM-compatible line adapters, and a power supply.

The front panel of the unit has a power indicator and carrier indicator for each channel in addition to local test and remote loop-back features.

Prices for the modem start at \$300 and depend on configuration, the company said. The unit is available in 30 days from Vadic at 916 Commercial St., 94303.

### Monitor Spots Line Troubles

SUNNYVALE, Calif. — An interface monitor designed to locate line malfunctions between remote terminals and central DP sites has been introduced by ESL Inc.

Designated the DM 108, the monitor includes an indicator panel that can operate up to 100 ft from the interface. The device can monitor up to 14 EIA interface signals such as data transmit, data receive and data terminal ready.

The monitor is normally connected between the user's terminal equipment and modem and the display panel can indicate failures that occur at a terminal, transmission line or central site, the company said.

The interface monitor costs about \$300. ESL Inc. is at 495 Java Drive, 94086.

### Independent Inspectors Favored

WASHINGTON, D.C. — Any certification of customer-provided equipment should be done by independent licensed inspectors. This position was included in a recent letter to FCC Chairman Dean Burch from Edwin E. Kirby, president of Control Inc.

Citing recent recommendations for a certification program presented by the PBX procedures and enforcement subcommittee, Kirby said it called for vendors to have equipment inspectors on their own staff. There would be a tendency for such staff inspectors to "certify now and correct later" when problems were found, Kirby said.

The use of an independent testing laboratory for certification is the logical method for any final certification plan, Kirby said.

## For Network Usage

# Com-Share Evaluates Data Terminals

By Ronald A. Frank  
Of the CW Staff

ANN ARBOR, Mich. — For a time-share user, the communications link he establishes through his terminal determines how well he can interface with the capabilities of the service.

If a terminal is not compatible with the line speeds, software or other specifications set by the time-sharing firm, the user may be limited in his operations.

Recognizing this importance in terminals, modems and other equipment,

Com-Share Inc. has established its Terminal Evaluation and Support Program (Tesp) to test the performance and reliability features of such devices.

"After purchasing or leasing a terminal unit, the time-share user may discover that his terminal is limited in capability, unreliable, or the supplier does not provide proper maintenance and support," said John Duffendack, Com-Share's director of communications.

Under the Tesp program, several terminals are tested each month after submission by vendors. Included in the tests are teletypewriters, CRTs, portable terminals and remote batch terminals, including those with "intelligence" in the form of expanded storage.

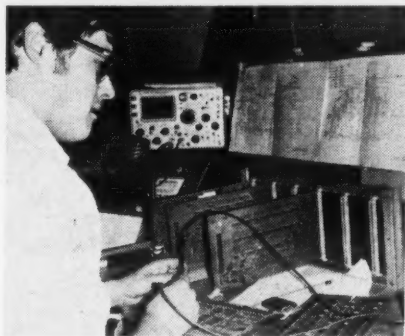
About 20% of the equipment submitted for test is approved, Duffendack said, and about 20 suppliers now have the Com-Share seal of approval.

In addition to testing the operating characteristics of a terminal, Com-Share technicians often dismantle the unit under test to check individual components. "Unless the vendor allows us to study the device from all aspects, we cannot be certain that it meets our requirements," Duffendack said.

### Component Testing

In addition to evaluating equipment for user efficiency, Com-Share requires that suppliers allow the dismantling and testing of individual components where necessary. The time-share firm will suggest circuit modifications if required to interface with Com-Share hardware and software capabilities. The firm uses XDS CPUs in its network and compatibility with this equipment is stressed.

Although the Tesp program is designed primarily to aid Com-Share subscribers in the selection of equipment, the firm will provide evaluation results and a list of approved equipment, Duffendack added. Com-Share is at 3853 Research Park Drive, 48106.



(CW Photos by R.A. Frank)

Com-Share's Tom Stretch tests Tel-Tech modem cards (left) while John Overmars checks the print registration on a Memorex 1240 terminal.

## ICC Modems Reduce Turnaround

MIAMI — International Communications Corp. has introduced two MOS LSI modems with optional fast line turnaround and remote test capabilities.

Designated the Modem 24 LSI and Modem 20 LSI, the units operate at 2,400 and 2,000 bit/sec with a turnaround time of 8.5 msec. Normal line turnaround on Bell 201 or compatible modems is 150 msec, an ICC spokesman said. The increased turnaround speed, which ICC says can double throughput in some applications, results from a feature called Fastar which makes it unnecessary to wait for the echo

suppressors to turn around on the line, the spokesman said.

Both modems offer a standard self-test pattern generator feature which allows a line to be tested manually at both ends. The optional remote test feature allows an operator at a central site to activate loop-back switches at outlying installations by remote control. Auto answer and reverse-channel options are also available.

The basic modems cost \$1,780 and lease for \$53/mo with first deliveries scheduled for next September. ICC is at 7620 N.W. 36 St., 33147.

## Couplers Tie Instruments, CPUs

SANTA CLARA, Calif. — A series of couplers designed to connect analog or digital instruments to computer systems has been introduced by Ambient Systems Inc.

Called the Dataspan 400 Series, the couplers convert data into computer-compatible format in on-line or off-line mode. On-line data can be entered directly into a CPU or through a teletypewriter grade terminal operating at 10 char./sec, a spokesman said.

Each of the six couplers in the 400

Series includes a "memo log" circuit card that determines the data code format. In addition to Ebcidic, BCD and Ascii, most formats can be supported. The plug-in circuit cards can be alternated for varied format usage, the company said.

The 400 Series couplers cost from \$995 for the 410 to \$2,995 for the 460 which includes a 10-channel multiplex capability. The units are available in 45 days from Ambient systems at 3020 Scott Blvd., 95050.

## Telecommunications M.S. Degree Offered

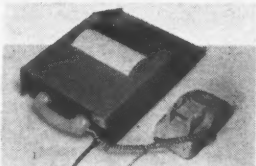
BOULDER, Colo. — A graduate-level program in telecommunications at the University of Colorado leads to a Master of Science degree in telecommunications management.

The new curriculum is designed to "train communications generalists for management positions," according to Professor S.W. Maley.

The degree program can be completed in one calendar year of three semesters and includes courses in telecommunications and communications theory. Regulatory concepts and the role of government in communications are also included. The university now offers a master's and doctorate program in computer science and this department will help sponsor the telecommunications program, a spokesman said.

Information about the program is available from Prof. Frank Barnes, chairman of electrical engineering, or Prof. George Coddington, chairman of political science at the University in Boulder, 80302.

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## May Be Refunded

# Private Line Rates Increased

WASHINGTON, D.C. — Price increases on AT&T monthly service terminal charges and installation rates for private lines were allowed to take effect on May 4 pending FCC action.

The rate hikes were originally suspended by the commission for 90 days but the time period ran out before the issue could be considered. Although the higher rates will be in effect, the commission has told AT&T that it will have to refund the extra revenue if the increases are rejected.

The increased charges cover private line services such as 3000 series lines used by many data users. Installation rates for a 3002 line will be increased from \$10/line to \$50/line. In addition the monthly service terminal charge will jump from \$12.50 to

\$15/channel for half duplex service and from \$13.75 to \$16.50/channel for full duplex service.

When AT&T first proposed the higher rates late last year, the FCC included the proposal in the long-standing Telpak private line docket 18128.

Among the firms that have filed objection to the increased charges are Bunker Ramo, East-

ern and United Air Lines, Litton Industries, MCI, the Independent Data Communications Manufacturers Association, National Data Corp.

AT&T has estimated that the increases will bring in an additional \$30 million per year in increased revenues covering 1000, 2000, 3000, 4000, 5000, and 8000 series private line offerings of both voice and teletypewriter grade channels.

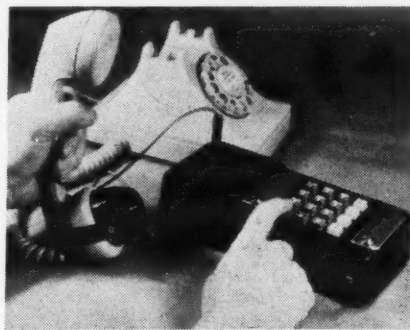
## Metroprocessing Offers 16-Key Tone Coupler

WHITE PLAINS, N.Y. — Metroprocessing Corp. of America has introduced a 16-key acoustically-coupled "terminal" that generates standard Touch-Tone codes.

The four extra keys can be used for data security codes, alphabetic shifts, and data-field designations, according to the company. All tones generated by the FT-1660 "follow telephone industry standards" and will work with computer systems capable of receiving Touch-Tone signals such as voice response systems.

The device includes a "slip-on" acoustic coupler which fits over the transmitter portion of the phone handset rather than the more conventional cradle-type coupler.

The FT-1660 includes the letters "Q and Z" and punctuation marks to provide complete alphanumeric capability, the company said. The FT-1660 sells for \$200. A 12-key model is also available for \$185 from 64 Prospect St., 10606.



FT-1660 Coupler

## Badger Adds Packages For DTS-100 Terminal

RICHMOND, Calif. — Badger Meter Inc. has added two no-cost packages to the software utilities library for users of the DTS-100 remote batch terminal.

A Hasp "multileaving" package is said to allow data transmission at 19.2 kbit/sec. The software supports card-oriented jobs to be printed while magnetic tape data is being transmitted. The package allows the DTS-100 to handle 7- or 9-track tapes in formats up to 2 kbyte/record at 556 or 800 bit/in.

The Hasp package supports full data compression to improve throughput rates using either multiple file reels or multiple reel files, the company said.

The Terminal Program Generator (TPG) makes stand-alone processing of the DTS-100 available to the user. The TPG package employs high-level language to condition, process and output data to peripheral devices.

The package supports all DTS-100 peripherals including card units, tape drives and printer. Coding specifications describe input/output formats, processing and report sequences including master file updating.

The Electronics Division of Badger Meter is at 150 East Standard Ave.

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# EASYTRIEVE

## problem

What is the impact of issuing all employees in organizations 916, and 925 through 933 a fifteen percent pay increase? The report will display the employee's organization number, name, present annual pay, proposed annual pay and the difference, and ordered by employee name within organization. Subtotals will be generated for each organization with final totals.

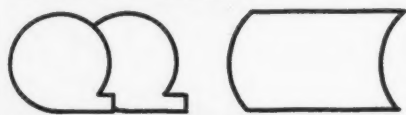
## problem solvers

## analyst and EASYTRIEVE

## problem code

```
PAYFILE 1200  CRG 138 3 N  EMPA 2 5 N  NAME 7 15 A
(ANNUAL PAY) 199 6 NO  (NEW ANNUAL) A 6 NO  INCREASE X 5 NO
9999
IF CRG EQ 916, 925-933
INCREASE = (ANNUAL PAY) X 15 / 100
(NEW ANNUAL) = (ANNUAL PAY) + INCREASE
SORT CRG NAME
CONTROLS CRG
EFFECT OF PROPOSED WAGE INCREASE FOR SELECTED ORGANIZATIONS
LIST NAME DETAIL CRG NAME (ANNUAL PAY) (NEW ANNUAL) INCREASE
0 RECORDS TOTALLED
```

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Castle & Cooke, Incorporated	Quelle, Germany
Central Michigan University	Suburban Trust Company
Central National Bank	Sun Oil Company
Citizens and Southern Bank	Touchette Corporation
City of Atlanta	U.S. Dept. of Agriculture
City of Honolulu	Fort Richardson, Alaska
Fairfax County Government	Medical R & D (Army)
First National Bank	U. S. Department of Commerce
Fischer & Porter Instruments	U. S. Department of Interior
Fulton County Government	U. S. Department of Justice
Glanzstoff AG, Germany	Peace Corps
Howmet Corporation	Supreme Court
Helme Products Incorporated	Webb Realty Corporation

## solution

12/05/02 EFFECT OF PROPOSED WAGE INCREASE FOR SELECTED ORGANIZATIONS					PAGE
CRG	NAME	ANNUAL PAY	NEW ANNUAL	INCREASE	
916	LELL LENTHAL	9,513	10,939	1,426	
916	SORENSEN	16,009	18,330	2,321	
		26,322	30,269	3,947	
927	ELLENDER	7,913	9,099	1,186	
927	NATAPW	6,317	7,264	947	
927	RAPPAPORT	7,913	9,099	1,186	
927	SORENSEN	17,289	19,882	2,593	
		39,432	45,344	5,912	
930	BECKLER	8,153	9,375	1,222	
930	CHAMBERLAIN	7,359	8,402	1,043	
930	CHAMBERLAIN	9,911	11,397	1,486	
930	GOACHESTER	8,519	9,796	1,277	
930	ELLENDER	26,000	32,200	6,200	
930	ELLENDER	8,606	9,896	1,290	
930	LELL LENTHAL	12,938	14,878	1,940	
930	RAPPAPORT	8,146	9,370	1,224	
931	BECKLER	7,149	8,221	1,072	
931	CHAMBERLAIN	5,316	6,113	797	
931	GOACHESTER	6,519	7,496	977	
931	IRONDEQUOIT	7,447	8,504	1,057	
931	LELL LENTHAL	5,762	6,653	891	
931	NATAPW	5,762	6,653	891	
931	OPPEWISSEER	5,762	6,653	891	
931	RAPPAPORT	6,153	7,035	882	
931	RAPPAPORT	7,447	8,504	1,057	
931	WASHINGTON	6,125	7,003	878	
		65,382	75,145	9,763	
932	ELLENDER	7,823	8,996	1,173	
932	IRONDEQUOIT	8,969	10,314	1,345	
932	QUACKENBUSH	8,153	9,375	1,222	
932	RAPPAPORT	8,153	9,375	1,222	
932	TODENBUSH	7,823	8,996	1,173	
932	UNDERWOOD	6,125	7,003	878	
		67,046	76,049	9,003	
		259,668	298,601	38,933	
30	RECORDS TOTALLED				

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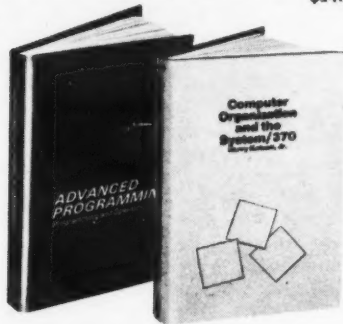


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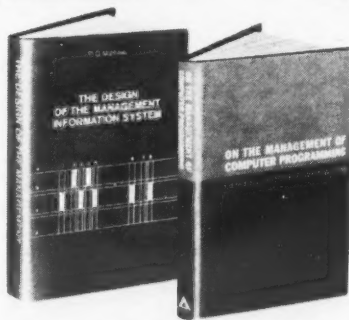
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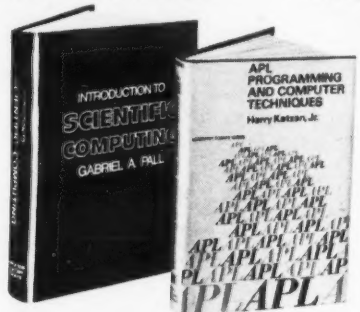
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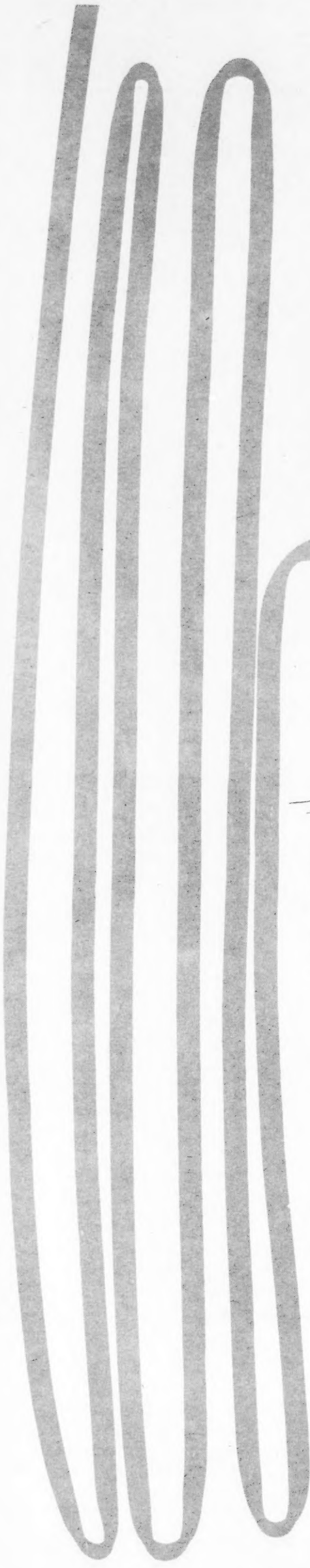
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## Bits and Pieces

### 360/50 Gets 768K Memory, Expansion to 1M Claimed

STAMFORD, Conn. — CIG (Computer Investors Group) has increased the memory capacity of an IBM 360/50 to 768K bytes, one-and-one half times the normal capacity, by installing Data Recall add-on memory.

The add-on memory, which CIG said can be increased to 1M bytes, will be used in place of the slower Large Core Storage normally used to increase a 360/50 beyond design size.

The megabyte capacity of the 360/50 makes it attractive to users who had been considering the 360/65 or 370/155, CIG said.

### Raytheon Service Center Handles Minis, Teletypes

BURLINGTON, Mass. — Users of any major minicomputers will be able to have their minis reconditioned, refurbished and reconfigured by Raytheon Service Co.

The company, currently engaged in third-party maintenance of computers and peripherals, will also provide service on Teletype Models 33 and 35 as well as on BRPE (Burpee Reader Punch Equipment) paper tape and magnetic tape equipment.

The cost of the servicing is determined for each instance, and there is no minimum quantity required, Raytheon said. The first of several planned service centers is at 12 Second Ave., 01803.

### Datapoint 2200 Gets Disk

SAN ANTONIO, Texas — Computer Terminal Corp. has introduced an integrated data conversion and entry/computing system combining its Datapoint 2200 intelligent terminal and a 2.4M byte disk drive. The console-mounted disk functions as a peripheral to the 2200 processor and features a removable cartridge.

The basic price of the Datapoint 2200 begins at \$6,040 or \$128/mo on a four-year lease. The disk drive can be bought for \$9,800 or leased for \$211. Computer Terminal Corp. is at 9725 Data Point Drive, 78284.

### Smaller Bits

Systems Furniture Co., Gardena, Calif., has a new model of the Data Desk which incorporates a 19-in. rack-mounted pedestal which can accommodate a tape drive, minicomputer, terminal controller or other modules.

Spectronics, Dallas, has a hand-held optical reader to read standard Kimball or Dennison merchandise tags, interfaces with simple recording equipment or sophisticated data systems and is compatible with all point-of-sale terminals, according to the company.

## Proper Tape Care Can Pay for Itself

By Frank Piasta  
Of the CW Staff

NEWTON, Mass. — The computer installation that neglects its magnetic tapes may be passing up the chance to significantly reduce its operating budget.

According to figures compiled by the Federal Government, a tape with 24 or more read errors costs the installation more than its replacement value in lost computer time.

Proper care can defer the date when a tape reel has arrived at its breakeven point. The adoption of proper handling techniques in the computer room and tape library is the first step in such a program.

### Tape Canisters

Tape canisters should be utilized at all times when the tape is not in use. Wrap-around rings have recently grown popular, but are thought by some authorities to offer a lower level of protection than the canisters.

Due to their particular characteristics, wraparound rings require that the user change his tape-handling techniques. Dust, for example, must be brushed from the exposed reel flanges before the ring is removed and before it is replaced.

But the canister does prevent tape damage caused by the reel flanges. The rings encourage operators to grasp a reel by its flanges, which can seriously damage the tape edges.

The canister also avoids the pressure placed on the reel flanges caused during storage of the tapes. The reel is suspended by its hub in the canister, but with the wraparound ring the pressure is applied directly to the flanges, causing flange distortion and consequent tape damage.

### Day-to-Day Handling

The careful handling of the tapes in day-to-day operation can bring dividends in increased useful tape life. Tapes should

be stored in about the same temperature and humidity environment as that in which they are used.

If tapes have been subjected to abnormal environmental conditions, they should be stored in the computer room or its equivalent for at least 24 hours.

Dirt is the greatest enemy of proper tape operation. Particles as small as .00046 in. can cause a tape error.

Empty tape containers should never be left open; wraparound rings should be hung in a clean area when not in use. A clean stopper should be used to secure the end of the tape, but rubber stoppers should not be used with wraparound rings as the extra thickness can damage the tape.

### Room Environment

Attention to the room environment can also bring dividends. Smoking, eating and drinking in tape libraries and computer rooms should be prohibited, and traffic through these areas held to a minimum.

Special attention should be given to the air-conditioning filters in the library and computer room. Fiberglass filters, according to some authorities, often fail to prevent the penetration of fine silt and

tend to deposit particles of fiberglass on the tapes.

If errors persist throughout the length of the tape, an inspection should be made to determine whether they are distortion errors or dirt errors. Distortion errors, such as wrinkles, creases or turned-up edges, usually result from careless handling and can rarely be corrected. Dirt errors resulting from the accumulation of foreign matter on the tape oxide can usually be corrected by cleaning the tape.

An estimated 90% of tape errors can be removed by using equipment which passes the tape over a knife edge and removes any protrusion from the oxide. The average cleaning machine can handle about 6 tape/hr.

A second method combines the removal of protrusions with the precise location of every error which has not been removed. On a second pass, the machine stops at every unresolved error area, allowing the operator to inspect the tape with a microscope and to try to remove the cause of the error with a scalpel.

In addition to producing a nearly error-free tape, the certification process will catalog the remaining errors on the tape. Tape certification takes about 15 min/reel, on the average.

## Intel Offers 3330 Power to 65s

SAN FRANCISCO — Users of IBM System 360 models 65, 67 and 75 will be able to get 3330-type capabilities from Intel, although IBM restricts its high-performance drive to the 85 and 195.

Rotational position sensing (RPS), in the opinion of industry observers the most important 3330 feature, is retained on the 360 version of the Intel 7330.

The Intel device has two advantages over the IBM unit. The 7330 offers users an optional 4-channel switch that allows a 7330 system to be shared among up to

four 360s and 370s in any combination. The Intel unit may be attached to the same channel as tape drives without losing the RPS capability, not possible with the IBM system, Intel said.

The Intel drive/controller overcomes the obstacle that forced IBM to limit the 3330 to the largest two 360s. The IBM controller has to be attached to the 2880 Block Multiplexer Channel that is not available below the 360/85. The Intel 7330 system is attached to the IBM 2860 Selector Channel which requires no modifications, Intel said.

Needed modifications to OS/360 will be provided by Intel without charge. The software changes are contained and isolated to reduce customer exposure, Intel said. Most of the changes involve additional logic rather than modification and replacement of routines, Intel explained. Support is available for most OS users except for those systems which are machine-dependent (MP65, TSS, CP67). Other products such as Hasp and IMS are supported, Intel added.

An even larger user group, those with 360/50s, will also be able to use the large disks soon if current Intel efforts at adaptation are successful, the firm said.

The price of the 7330 disk system for attachment to a 360/65 is \$6,650/mo for an 8-spindle system on a two-year lease. Purchase price is \$256,428. First deliveries to 360 users are set for October from One Embarcadero Center.

## Add-Ons Expand 360/30s, 40s

LOS ANGELES — System 360/30 users now have a second source for memories four times larger than standard maximum with the latest add-on from Information Control Corp.

The Corpak-30 models can increase 360/30 capacity to 256K while a larger Corpak-40 allows a 360/40 to be increased to 448K, almost twice the design maximum.

The company had previously offered 360/30 memories to increase the capacity to 128K and 360/40 memories to 256K.

There is no deterioration in performance because of the oversize memories, a company spokesman said. He mentioned a site where a 128K 360/30 was next to a 128K 360/40, both running I/O-bound programs. The manager of the installation could see little or no differ-

ence between the systems, the spokesman noted.

The add-on memories are priced to save the user between 30% and 50% of the cost for an equivalent increment from IBM, the company said. On the shortest term lease (one year) the cost of a Corpak-30 to increase a 360/30 from 64K to 256K is \$3,925/mo including maintenance. Purchase price is \$140,000 and maintenance is \$85/mo.

The cost of increasing a 360/40 from 128K to 448K with a Corpak-40 is \$5,900, again on a one-year lease and including maintenance. Purchase price is \$220,000 and maintenance is \$72/mo. Service is provided by Sorbus.

First deliveries are scheduled for mid-July from 9610 Bellanca Ave., 90045.



## Your 360: Our Large Core Store remembers it well.

So well, in fact, that IBM System/360 users swear by our Large Core Store. We've already shipped dozens of them. Capacities? 1/2, 1 and 2 million bytes. Cycle time? Ranges down to 1.8 micro-seconds. Cost? A lot less than IBM's 2361 large core memory. That's our LCS. Plug-compatible with the 360... interchangeable with the 2361. It expands your 360's memory and it remembers to save your money.

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## Teller Terminal Features CRT, Performs Computations Off-Line

TRUMBULL, Conn. — The latest series of teller terminals from Bunker Ramo is said to include the first CRT-equipped units designed specifically for on-line use in the banking industry.

The 2001 Universal Teller Terminal uses its displays to provide such information as account data, tutorial routines for the operator, and visual verification of data being entered and edited.

Designed for use in both savings and commercial banks, the unit features a microprogramming processing unit to permit such changes in procedure as the handling of new types of accounts, or changes in interest or operational changes, to be made overnight, the company said. Calculations can be performed and data collected in the off-line mode, the company added.

Communications costs are kept to a minimum through the use of a network arrangement that allows up to 12 teller

terminals to share a single modem, and up to eight modems to be handled on a single circuit at 1,200 to 2,400 bit/sec, according to the firm.

Several optional keyboard arrangements are available. These include alphanumeric, 90-key full numeric and 11-key numeric pad configuration.

A block of 32 function keys allows selection of single or multiple transactions and functions by the teller. Combined with the CRT, the keyboard also can be used as an adding machine for off-line computation.

The 2001 is equipped with a printer that imprints passbooks and prints journal tape entries and transaction tickets for each transaction at a speed of 60 char./sec.

The printer can also be used to prepare checks and other documents, the company said. An optional feature of the 2001 allows automatic off-line data col-



The 2001 Teller Terminal includes a CRT for displaying customer transaction data.

lection.

The 2001 terminal is priced at about \$9,000. It will be available during the second quarter of 1973, according to Bunker Ramo.

## Disk System Offers Megaword Capacity, Fast Access Times

FAIRFIELD, N.J. — A fixed-head disk drive system from Digital Computer Controls, Inc. offers minicomputer users compatibility with DEC's PDP-8 and RF08, and an on-line capacity of 1M words.

The DU-1 disk and DC-1 controller provide access to as much as 256K 12-bit words per drive with an average access time of 8.4 msec.

Data is stored on each surface in 128 data tracks with a capacity of 2K word/track. Maximum data transfer rate is 3 Mbit/sec.

Damage to heads and disk surfaces during shipment or system relocation is prevented by an automatic mechanism that lifts all heads during start-up time and, after power-off, when the disk is slowing to a stop.

A manual front panel switch on the controller allows the operator to select one of four interlace ratios — 1:1, 2:1, 4:1 and 8:1 in order to allow the computer to handle more on-line peripherals.

A system can consist of one to four DU-1 drives and a DC-1 controller. The DC-1 is compatible with DEC software.

The controller and one disk are priced at \$11,000, with each added disk at \$9,000. Delivery is 30 days from 12 Industrial Rd., 07006.

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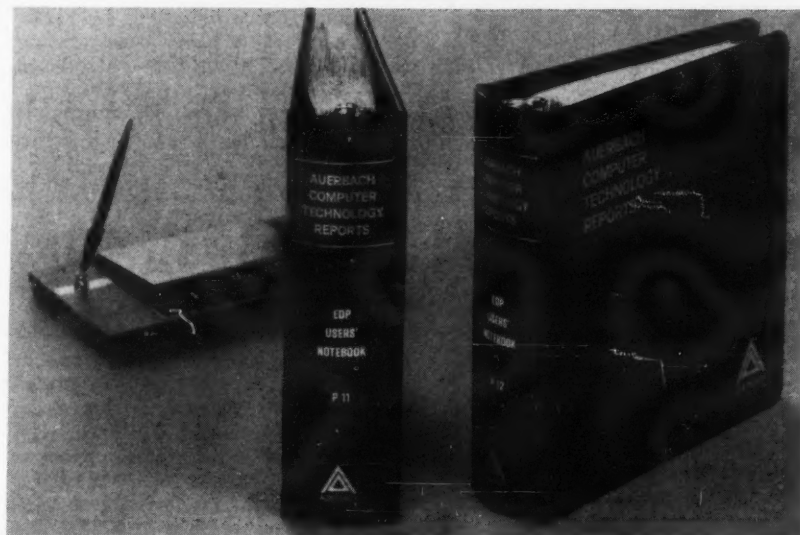
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## Controllers Connect IBM Drives to Minis

RED BANK, N.J. — Diva Inc. has developed a DC series of controllers that enables data prepared on a minicomputer to be used on an IBM 360 or 370 system.

An additional DD series of disk drives is available in models that are compatible with most 360 and 370 disk drives — including the 2311, 2310, 2314, 5440, or 3330.

The controller allows the attachment of any of these drives to a variety of minis including the Data General Novas, DEC PDP-8 and PDP-11, IBM 1130, Interdata 70 and 80 and others.

An IBM media-compatibility option, DM-234, modifies the controller to enable data to be written on the disks in a format that is directly readable by IBM systems.

Diva offers its units as either controllers only for connection to the user's disk equipment or as disk systems. The price of the DC series of controllers starts at \$7,000 and varies with the model of minicomputer and disk drive. The DM-234 compatibility option adds \$3,500 to the controller price.

The Diva DD/DC systems consist of the controller and from one to eight disk drives.

Prices for the systems start at \$11,700 for the 2310-compatible drive and at \$16,500 for the 2314-type unit.

Diva Inc. is at 58 Maple Ave., 07701.

## Register Data Converted To Tape With Victor Units

CHICAGO — Point-of-sale electronic data acquisition has been introduced by Victor Comptometer Corp. for the chain retailer and middle- to large-size single store owner.

A magnetic tape cartridge connected to the cash register records all sales information. The magnetic tape is mailed to headquarters or data center for conversion in minutes to industry-compatible tape that can be used with any general-purpose computer.

The cash register system contains all the normal point-of-sale features such as customer receipt, visible indication, tamper-proof audit tape, key locks for clerk drawers and flash totals. The cash register/tape recorder is priced at about \$3,000. The tape converter including tape drives will cost about \$15,000.

Units are available on six-month delivery from 3900 N. Rockwell St., 60618.



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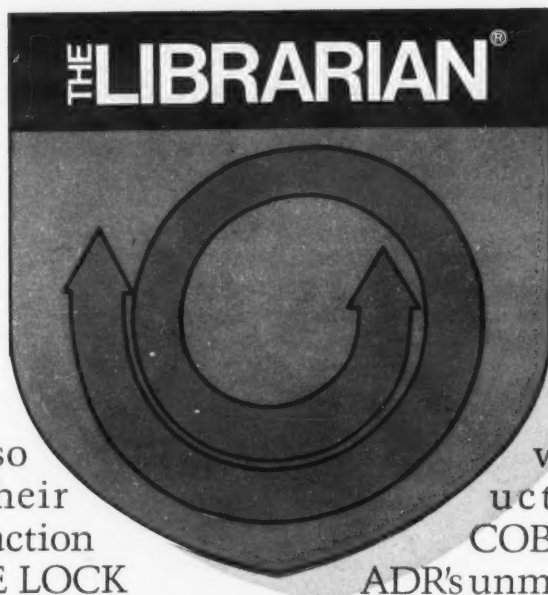
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## Honeywell 700 Lease Prices Range From \$1,020-\$5,500/mo

WALTHAM, Mass. — Prices for typical configurations of the recently announced Honeywell System 700 [CW, May 3] range from \$1,020 to \$5,500/mo on a one-year lease.

A typical Terminal System for controlling eight terminals and including a host computer link and a 716 mini with 12K memory can be leased for \$1,500/mo on a one-year basis or can be purchased for about \$40,300.

A typical Peripheral System of a 24K 716, 15M bytes of disk storage, 300 line/min printer, 800 card/min reader and binary synchronous communications can be leased for one year for about \$5,500/mo or purchased for about \$112,000.

The Multipurpose System is designed for program development, extensive data processing communications with terminals and other computer systems and real-time data collection. A typical sys-

tem would include a 12K 316 mini, real-time clock, teletypewriter, magnetic tape drive and paper tape reader and punch. Lease price for one year is \$2,168/mo and purchase price is \$38,380.

The Batch Processing System, also based on the 316 mini, is a disk-oriented system designed primarily for batch-processing applications and program development. A basic configuration includes a 12K 316, data multiplex control unit, paper tape reader and punch, Teletype ASR 33 and a 900K word removable disk system. A one-year lease costs \$2,235/mo and purchase price is \$45,270.

A Remote Message Concentrator configuration to concentrate 16 lines consists of a 12K 716, code conventions, real-time clock/timer, binary synchronous down-line load, synchronous single-line controller and low-speed multiline controller leases for one year at \$1,260/mo and sells for \$35,000.



The Terminal System can handle eight terminals and communicate with a host computer.

A Remote Line Concentrator to handle four lines includes an 8K 716, real-time clock/timer synchronous single-line controller, low-speed multiline controller and carries a one-year lease price of \$1,020/mo and a price tag of \$28,400.

The 316-based Multipurpose and Batch Processing systems are available for immediate delivery. The other 700 Systems will be ready in July, Honeywell said.

## Larger Disks Added To All Xerox Sigmas, 11-High Pack Used

EL SEGUNDO, Calif. — Xerox Corp. (formerly Xerox Data Systems) has introduced two large-capacity disk drives for all members of the Xerox Sigma family of computers.

The new drives, the first to be manufactured by Xerox, will be offered to users in addition to the older CDC-produced disk units.

### Data Capacity

The primary difference between the Model 7260 and the Model 7265 is data capacity, according to Xerox. The 7260 unit stores a minimum of 90M bytes, expandable to 675M bytes, while the larger 7265 can store up to 1,365M bytes.

Access time averages 30 msec and transfer rates are up to 512 Kbyte/sec. Dual access arms are optional.

Other features include electro-optical tracking for precision-head positioning, thermal composition to minimize off-track errors caused by temperature changes, hardware write protect and independent seek operations which allow overlapping to minimize access time.

The drives use a standard 11-high disk pack, similar to that used with the IBM 2314 disk drive. The 7260 records data at 100 cyl/in. with 200 working plus three spare cylinder/surface. Each cylinder contains 20 tracks with 11 sector/track. The larger 7265 records at 200 cyl/in. Each surface contains 404 working cylinders plus seven spares. A 4-byte, 32-bit word length is used.

The 7260 in a typical configuration of four drives with a capacity of 180M bytes leases for \$2,780/mo for one year, and sells for \$11,200. It will be available in the fourth quarter of 1972.

The 7265 in a typical configuration of eight drives with a capacity of 728M bytes leases for \$4,125/mo for one year, and sells for \$165,500. It will be available during the first quarter of 1973.

## Printer/Plotter Said To Have 14-in. Format

IRVINE, Calif. — The Varian Data Machines Statos 31 is claimed as the first electrostatic printer/plotter with 14-in. format which will operate on-line to most minicomputers.

The unit's features are:

- Produces a 14-in. by 11-in. plot in 5 seconds.
- Prints 1,000 line/min in virtual silence.
- Simultaneously plots and prints alphas.
- Interfaces in either print or plot mode.

Three design innovations include Auto-step, a command sequence to maximize high-speed computer operation; Servo-lock, a power-driven system for precise data at very high speeds; and Dual-Stage, a toning process to insure uniform record quality over all speed ranges.

The Statos 31 will be available at \$10,400, including a typical interface, this summer.

## Solid State Add-On Memory Means Savings on 316/516s

VAN NUYS, Calif. — A plug-compatible solid-state expansion memory for Honeywell 3C-DDP-516 and DDP-316 computers from Signal Galaxies comes in 4K to 28K configurations and offers a price reduction for Honeywell users, according to the company. For example, a Signal Galaxies' 8K memory costs \$4,810, a savings of approximately \$10,000, the company explained.

The price for the first 4K of expansion memory is \$3,327. Additional 4K increments cost \$1,483. Delivery is 30 days from 6955 Hayvenhurst, 91406.

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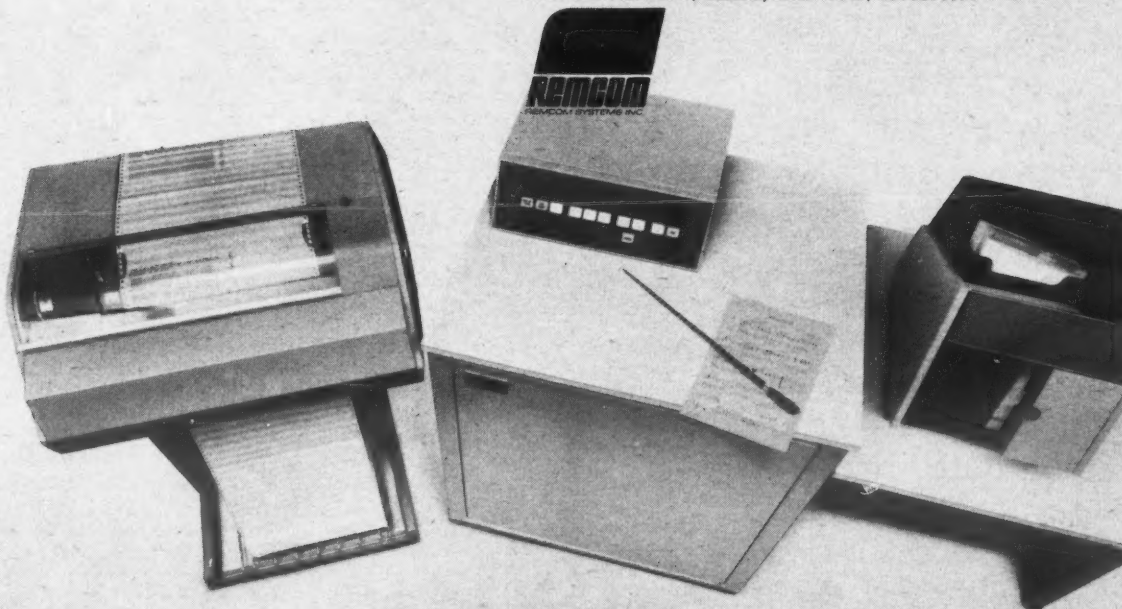
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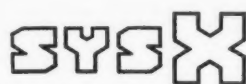
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# Car Maker Meets Demand With Modular Systems

By Molly Upton  
Of the CW Staff

NEWTON, Mass. — With a centralized administration, data processing is playing an active role in increasing productivity at Fiat, Italy's largest car manufacturer.

Rather than constructing a management information system for the entire corporation, Fiat has chosen to build subsystems, which give managers on different corporate levels access to the information they need, as well as providing "building blocks of data" for their superiors.

The firm uses Honeywell, IBM, Burroughs and other equipment. Yearly rental for DP equipment installed in Italy runs about \$15 million to \$16 million, and about \$6 million elsewhere, according to Paolo Sardi, director of systems and information for Fiat.

There are no special problems with the multivendor approach, since the machine is suited to the application, Sardi noted during an interview here.

The subsystem, or multilevel approach to MIS, is used in 18 installations in Italy,

12 in Europe and six overseas. There are about 600 analysts and programmers, out of a total employment of 190,000 for the firm's car, tractor and diversified product divisions.

All DP purchasing, training and education of DP personnel are done through the central office in Turin, Italy, which also reviews requests for new applications. Since Cobol and Fortran are the only languages used, there is a large degree of flexibility in the system, he said.

In the marketing department, orders from 32 Italian branches and more than 400 dealers and overseas orders are transmitted to Turin, where production considerations, such as number of workers, left- or right-hand drive, are added.

Orders are filed by date, but production factors, such as enough orders for a full assembly line of one model, determine the order of manufacture. When a car does not match an order, the original order is reinserted in the computer file, which is searched for an order for that

particular type of car. Then, each car is kept on file for six months.

## Spare Part Ordering

Computers also supervise an automatic reordering system for spare parts. Currently there are three GE 437s and two GE 130s which handle 100,000 transactions a day for the 32 branches. The warehouse stocks 140,000 items.

Fiat is constructing another warehouse outside of Turin, which will have a Honeywell dual processor Model 6060 with 256K, 36-bit words, two Datamet 355 communications processors, each with 32K and four Model 316 minis. A DSS 190 disk system with 12 drives and two dual-channel subsystems with a capacity of 1.6 billion characters, and eight tape drives, two printers, card readers and punch have also been ordered.

The warehouse will have an on-line real-time automatic selection system, with a stacker crane and conveyors driven by the 6060 through the minicomputers. The

system is scheduled for operation next March.

Sardi is looking at packaged software to play an important role in the future. Fiat is also conducting an intensive study on the feasibility of more peripherals.

Other MIS components include personnel, marketing and spare parts. The budget control and production systems are not operative yet and the scientific and technical data system will be run on a time-sharing basis, allowing access by engineers, who use Tektronix and Adage units for design.

## 5 Scottish Towns Pitch In to Provide Better Environment

EDINBURGH, Scotland — Five new towns in Scotland have joined together to implement a computerized project aimed at streamlining a variety of community tasks and operations.

The towns of Cumbernauld, East Kilbride, Glenrothes, Irvine and Livingston, representing a total population of nearly 100,000, have ordered a computer system to facilitate their administrative, planning, technical and financial operations.

A major aim of the five new towns is to use the computer to create the best possible environment for the citizens. The applications will include architectural design, landscaping and highway planning and other administrative services.

The project reflects an unusual level of cooperation among the five towns. They have resisted the growing — but often impractical — tendency toward separate systems and have cooperated in a joint

## Spotlight on Sharing

venture where the costs are shared and each community benefits from the full capability of the system. Besides substantial savings in time, effort and money, the project provides an effective medium for the exchange of ideas among the communities.

"We are all trying to do the same job in different parts of the country, namely to increase the opportunities for a good life with full employment," said Olaf Thornton, chairman of the executive committee of the Scottish new town computer service. "We feel that the introduction of a joint computer service will assist us by making our organizations more efficient and effective."

The computerized system is based on a Burroughs B 3500 central computer linked by private lines to TC 500 terminals in each of the five new towns.

## Data Integrity

At full capacity, the B 3500 will be able to perform as many as 20 operations at the same time. Although all the information will be stored in the computer's central base, tight security measures will be incorporated to protect the integrity of the data. Data on each town will be available only to the authority concerned via its own terminals.

The TC 500s will be used for real-time financial and administrative inquiries and for direct input and output of data.

Architects and engineers will also be able to use the central computer for technical calculations on a time-sharing basis via teletypewriters at each of the new towns.

The five communities involved in the project are part of the UK's new town movement which began during the 1930s and was given further impetus as a result of bombing destruction during World War II. It called for the creation of new communities to relieve the crowded urban centers and to provide for orderly, efficient growth.

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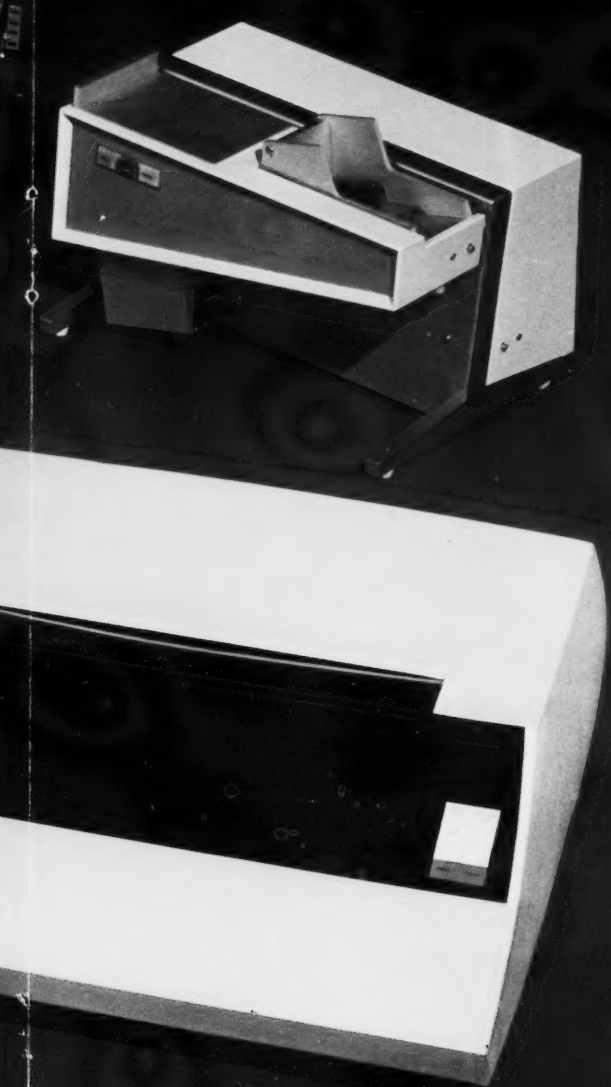
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## Library Systems — Part II

## Best to Take Automated Approach

WASHINGTON, D.C. — Many problems have to be overcome in order to apply computer technology effectively to libraries and information systems across the nation, according to a recent report from the Computer Science and Engineering Board.

"If a national pattern were established enabling both national and local developments to take place within it, extant and emerging information technology, which provides for improvement, could be applied on a broad scale," the group (part of the National Academy of Sciences) says.

However, the report warns that "unless the appropriate environment and certain critical capabilities are created with a national system in mind, there is little hope that the magic of automation will be effective."

The rapidly evolving state of computer and information technology "leaves no doubt of the ultimate feasibility, as well as the necessity, for taking the automated approach," the board says.

## Must 'Take Advantage'

And if present libraries and other information-producing organizations do not take advantage of new techniques to provide greater information accessibility they may well "become obsolete," the report goes on.

In the past, however, efforts at development of systems in this area have suffered "from the lack of off-the-shelf input and output devices capable of handling an appropriate character set. They also have been hindered by the costs of storing or handling large files, injured by the growing pains of the adolescent computer industry, and lacking in comprehensive national cooperation toward a unified objective," the group states.

## New Intellectual Routes

To help overcome the problems facing the libraries and other information resources, information that has been organized along traditional lines in the past must be reorganized and somehow made accessible via new intellectual routes. Information entities that were unrelated before must be brought together under new categorizations," the report says.

It notes that "the library and information community is large enough and important enough to influence some products of the computer industry," but would be better equipped to wield this influence if it was not so fragmented relative to technological objectives and requirements.

The library community also has to try to develop transferable systems, according to the report.

## 'Widespread Misconceptions'

"There are widespread misconceptions about transferability of computer processes, especially among those who have not tried it. The great flexibility, generality and computational speed of computers have encouraged the development of a legend about the ability to take an isolated accomplishment and use it elsewhere with minimal, if any, work required to perform the transplant," the study continues.

"If adequate prior planning has been

## 747 Flies Seattle-Tel Aviv In 3 Minutes of Schedule

MANHASSET, N.Y. — El Al Israel Airlines recently completed one of the longest Boeing 747 delivery flights from Seattle to Tel Aviv with the help of computerized flight planning.

Total flight time for the 6,147 nautical mile route was 12 hours and 32 minutes. The flight was completed within three minutes of the elapsed time projected.

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Speas Associates provides computer services for 63 world airlines.

done for the transfer, and with careful design control suitable for a specified operating system, the transfer can be made, but it will not occur automatically," the report warns.

There is presently a problem in capturing data in machine-readable form, the study says.

In the long term, it says, digital computer-readable forms for information are probably the best forms. However, because of the presently "incomplete penetration of this technology into publication activities" and the economies of conversion into machine-readable forms, near-term and mid-range plans and developments must be based on image storage for most primary documents.

"To speculate on the ability to store and use large computer-readable information files without being able to ensure that they can be prepared" economically "is of little or no value," it adds.

The report also notes that the software for "organizing and managing large computer system files is still in an embryonic state." The library community must press the computer industry to develop such systems to meet their particular needs, it believes.

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## DP Can Enhance Image

# Small User Must Overcome DP Fear

By E. Drake Lundell Jr.

Of the CW Staff

NEW HAVEN, Conn. — The biggest hurdle facing the potential small business computer user is his fear of the system, according to a small businessman who has made the transition to computers successfully.

"The small businessman has to be educated not to be afraid of using a computer system," Norman Benedict, a real-estate appraiser here, said recently.

However, once that fear has been overcome, Benedict said, many small businessmen would find computer use cheaper than handling business problems manually.

In addition, computer use can enhance the image of a small business in the minds of its customers if handled properly, said Benedict, who made the transition from manual methods to a computer system just over a year ago.

At the same time, Benedict said individual small businessmen usually can't get the education they need on their own and said the best way to get advice and education on computer use is through

### The Small Systems User

national associations covering their specialized areas.

If small systems users can get their national associations interested in computer use, the associations can develop educational programs and software that can be shared by the individual users, to the benefit of every member of the group, Benedict said.

"By sharing experience and solutions to problems" the associations can give the small businessman a better product than

any of them would be able to get on their own, he indicated.

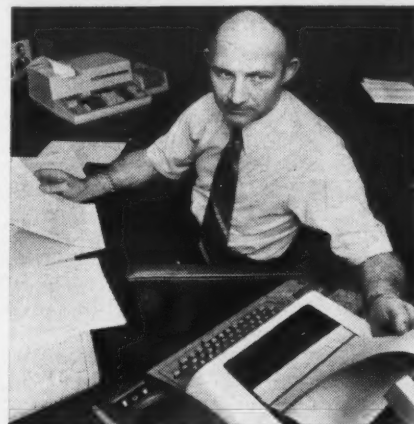
#### Case History

Benedict is a member of Educare, an education and software development group set up by the American Institute of Real-Estate Appraisers, the American Society of Real Estate Counsellors and the Society of Real Estate Appraisers to promote computer use in the real estate and appraising fields.

The group sponsors five day courses on the use of computers, aimed not at making programmers out of the attendees but rather aimed at overcoming the fear of the system and providing instruction on its use.

The group also bands together to have programs written for them that are applicable to their businesses.

Benedict, who admits that he knows "very little about computer science" even



Norman Benedict uses time-sharing for appraisal work.

after using the system for a year, is tied into the General Electric time-sharing network for his appraisal work.

"Appraisers who do not use computer systems will lose clients in the future," he predicted. "The clients are beginning to demand that their outside consultants use modern business practices, and the computer is a major tool of modern business."

Most appraisers today operate by a "seat of the pants" method, Benedict said, making informed guesses about the value of property over the long term.

"But with the computer system," he said, "I can make much better informed judgments. For example, I can use the system to anticipate population shifts, probable changes in the tax structure, and potential value of various sized lots over a period of years."

Most of the work could be done manually with calculator and slide rule, Benedict admitted, "but it never is because it is too time consuming and too costly," he added.

In addition, he said manual methods are not as flexible as the computer system. "I can change one input on the computer system and get a quick reading of its impact on the entire appraisal," he said, "but with the manual system recomputing the entire system to change just one input would be unrealistic."

At the same time, Benedict said the computer system was "extremely cost competitive" with the manual methods even though it provided more information.

Benedict said he uses a calculator for very basic computations and turns to the computer system when the problems become more complex. The total cost is around \$200 a month using the time sharing system.

The biggest problem he has found in using the system is in defining his needs to the software development people. "It really helps," he said, "to be able to work through the Educare group."

"It gives me contacts with other users in the same business and in many cases some other user has solved a problem that I have just discovered which saves me the work of having to carry out the development on my own."

Soon the clients will get even more sophisticated, he said. "They will not only ask the appraiser if he uses a computer, but will also want to know what programs he is using and how sophisticated he is," he said.

Today his field and other areas are just at the beginning of computer use, he said. "So far," he said, "we are just using the computer to do work that could be done manually — but we are doing it better and faster than possible before."

"In the future, when the costs come down we will turn to more on-line storage and more sharing of data base information on such subjects as population growth, taxes, etc.," he said.

#### S/3 Gets Disk Cartridge

NEW WINDSOR, N.Y. — A disk cartridge for the System 3 Model 1 and Model 2 or 3 drives that is guaranteed to meet or exceed all IBM specifications is available from Monarch Metal Products.

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## Architecture of Data Base Systems Subject of 2-Day ACM Session

ATLANTIC CITY, N.J. — Programmers and analysts can take part in a seminar on data base management systems architecture to be conducted by the Association for Computing Machinery (ACM) May 19 and 20.

The two-day session, at the Hotel Dennis, will be based on the capabilities specified in the April 1971 Codasyl Data Base Task Group report. To profit from the program, attendees should have actual programming experience in a high-level language, preferably Cobol, and some "exposure" to at least one data base management system.

### Professional Development

Part of ACM's Professional Development series, the seminar is designed to show how to progress from present day conven-

tional DP practices to an integrated system based on the features cited in the Data Base Task Group report. A single major system will be analyzed in

### Education

depth, according to Dr. Edgar H. Sibley, chairman of Codasyl's Systems Committee.

Sibley will share the podium with Dr. T. William Olle, who served on the Data Base Task Group and was chairman of the Systems Committee during the preparation of the reports on data base management systems. Other guest lecturers will participate in selected portions of the seminar, Sibley said.

The session will be repeated in

Albuquerque, N.M., June 1 and 2, in San Francisco, June 5 and 6, and in New York City June 12 and 13, he noted.

Olle will also be the instructor in another two-day ACM seminar on Data Base Management Systems — Features Analysis, scheduled for Washington May 22 and 23, in Dallas May 25 and 26, and in Montreal June 8-9.

This seminar will provide a survey of the features and capabilities of data base management systems both as a class of software and in terms of 10 systems in particular. It will be based on Codasyl's features analysis report released in May 1971.

The schedule of other Professional Development seminars is available from ACM, 1133 Avenue of the Americas, New York, N.Y. 10036.



Trainee looks at slide, listens to tape cassette before handling transaction on the 2980 terminal.

## CAI Links Slides, Tapes, Terminals

ATLANTA — New tellers at Fulton Federal Savings and Loan Association here are trained directly on the IBM 2980 terminals they use on the job, through an extended "computer-assisted instruction" system.

System software and lesson plans on an IBM 360/30 control a slide projector and an audio tape recorder, in addition to monitoring what the trainee does on the terminal.

When this system branches to another part of the lesson, to meet a trainee's particular needs, the slide carousel and audio cassette are reset as well.

The system, designed by Technical Analysis Corp. (TAC), Atlanta, also accumulates data on individual students and on lesson effectiveness so that the system can be modified.

The system could also be used for training of data entry clerks across a wide range of applications, according to TAC spokesmen.

The firm is at 175 W. Wieuca Road, N.E., 30305.

## Univ. of Minnesota, DP Users Cooperate

MINNEAPOLIS — An information systems analysis and design certificate program, developed last spring by the University of Minnesota, local chapters of professional associations and Minneapolis business firms, has been more successful than anticipated, but still has some rough spots, according to project director Ronald D. Visness of the university's School of Business Administration.

He is "enthusiastic" about the cooperation from business thus far and expects "the level of cooperation between industry and university will be even higher" as the program improves.

### Career-Oriented

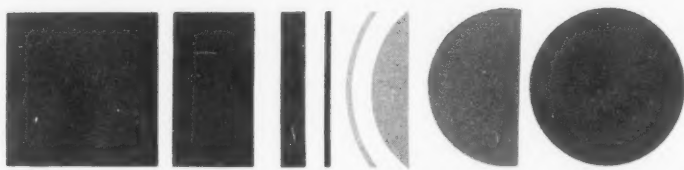
The program is directed toward students seeking careers in DP and those already in the field. It is structured to provide education and training for advancement to a more responsible position in DP, regardless of the student's current status.

The use of industry-based instructors is one of the program's strengths, and at the same time one of its weaknesses, the university found. These instructors can bring to the classroom experiences far more beneficial than any book example, but generally they have had limited teaching experience. As the instructors gain this experience, the program will improve, one spokesman said.

The total number of students registered in all courses exceeded the estimates of the planning committee last spring. It now appears that the first year's operation will break even rather than incur the substantial deficit the committee said it expected.

The university offers a certificate after completion of 58 credits under this program. Students transferring credits to this program from other institutions accredited by the university must take a minimum of 15 credits in the courses offered at the university to qualify for the certificate.

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## Better Training for Handicapped Studied

MILWAUKEE — A computer-assisted research project seeking better methods of rehabilitating handicapped persons has begun here at Goodwill Industries of Wisconsin, Inc.

Goodwill uses a small computer to help determine the effect of certain training, counseling and other services on the more than 500 physically and mentally handicapped persons working at its rehabilitation center.

"We believe the information the computer gives us will help us develop a person to his highest level, physically, psychologically, socially and vocationally," said Jerome R. Lorenz, associate executive director for human

employer more satisfaction," said Lorenz.

Goodwill Industries of Wisconsin trains handicapped persons in more than 50 trades and crafts, preparing them for work in outside businesses. Since beginning the training in 1919, more than 15,000 persons have been placed in jobs. All of Goodwill's computer operators are handicapped persons.

Initially, Goodwill is compiling a data base on the handicapped, or "clients," coming into the program for assistance. This information includes individual characteristics as well as information on all counseling, func-

tional training and other services that a person receives.

"Ultimately," said Lorenz, "we will be able to develop a statistical analysis that tells us that a person with a certain type and amount of counseling, training and other services, is likely to advance to a certain level of rehabilitation progress."

The information gathered during the research project is entered on punched cards as the client completes a counseling or training session. The IBM System 3 Model 10 correlates this information which, for a single individual, can amount to hundreds of separate items.



Time-forgotten clocks are returned to working condition at Goodwill Industries as part of a computer-assisted research project seeking better methods of rehabilitating handicapped persons.

resource management at Goodwill.

"This information should help us in assisting that person in obtaining a work level truly commensurate with his abilities. We expect people to become even better qualified for positions in industry and business, bringing themselves and their

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The 18/30's role as a superior, economical replacement for the 1130 is a field-proven fact. A General Automation representative will be glad to show you why dozens of customers have already switched to the 18/30 DMS, and what it can do for you. To find out, give him a call. We maintain offices with complete field service and technical support in principal cities in the United States and Europe. And we're growing by leaps and bounds.

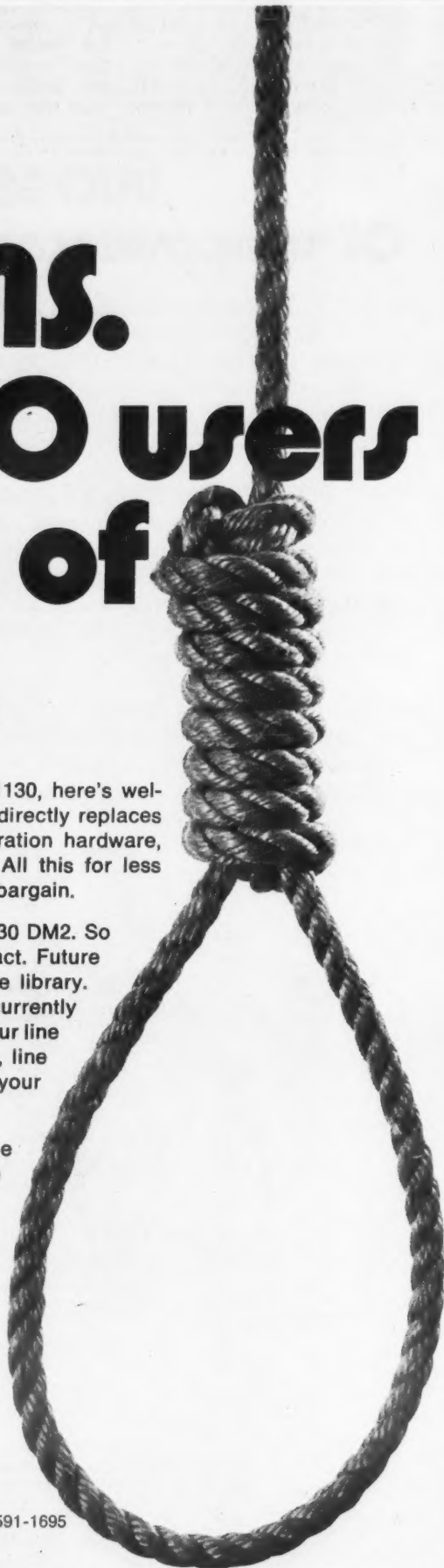
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## ACM Dues Hike Pending

NEW YORK — A dues increase is in store for the 27,000 members of the Association for Computing Machinery (ACM) because of decreasing computer industry support, according to the outgoing president, Walther M. Carlson.

In his third and final "unfinished business" editorial in ACM's monthly *Communications*, Carlson commented on the "sweeping changes within all segments of American industry" over the last five years.

These changes in attitude toward technical societies have taken the form of reduced financial, moral and technical support, Carlson said in the May issue.

### 'Crucial Factor'

In the case of ACM, the reduced support "has been a crucial factor in our financial management," he said. Four years ago, ACM dues were increased from \$18 to \$25, and industrial support (in terms of advertising,

exhibits at joint computer conferences and institutional memberships) amounted to \$15.80 per ACM professional member, Carlson related.

This year, "we estimate that industrial support to ACM will be less than \$3.50 per member," he predicted.

ACM, like the IEEE Computer Society and Simulation Councils, Inc., was a founding society of the American Federation of Information Processing Societies (Afips), which sponsors the joint computer conferences.

As "founding" societies, the three share in the profits of the JCCs, and therefore have strong interests in the financial status of those semiannual conferences.

Carlson's editorial memo continued to note that the drop in support, "coupled to the 25% inflation (reflected in consumer prices) since 1967," has "forced us to our knees financially," and ACM "must now face the step already taken by so many of our sister societies — a dues increase."

## Canadian Conference to Feature Four 'Streams' of Discussion

MONTREAL — A four-pronged approach to solving computer problems has been taken by the Canadian Information Processing Society (Cips), in planning the 1972 Canadian Computer Conference here, June 1-3.

The technical program has been broken into four "streams" of concurrent panel discussions and presentations: management; arts; humanities and education; software; and hardware.

R.C. Scrivener, president of Bell Canada Ltd., will deliver the keynote address. Conference chairman Colin Campbell said Scrivener's speech would present the views of a "major user and supplier" of computer services, and would discuss the development of EDP resources in Canada.

### 'American Challenge'

In a closing-day luncheon speech, Robert L. Perry, managing editor of the *Financial Post* will discuss how Canadians are responding in various business fields,

including EDP, to "the American Challenge."

The conference, at the Queen Elizabeth Hotel, is expected to be attended by about 1,000 registrants, about the same as last year's conference in Toronto, Cips officials said.

The conference also overlaps, on one day, the schedule of the Canadian Computer Show, an exhibition at Place Bonaventure, May 30-June 1.

## Societies/ User Groups

About 60 exhibitors will be showing peripherals, software, services and time-sharing capabilities, officials said.

The "management stream" of sessions will be opened with a five-nation survey of DP developments in Canada, France, Britain, Japan and the U.S. Speakers will review the profession in each country, outline government policy and present typical applications.

Registration for the full technical program, including two receptions, two lunches and one dinner, is \$85. Student rates are \$25, or \$10 per day. Information is available from the Conference Committee, Box 1772, Station B., Montreal 110, Quebec.

## Australian Show Set

BRISBANE, Australia — Sir Macfarlane Burnet, 1960 Nobel Prize winner for medicine, will be featured speaker at the fifth Australian Computer Conference here May 22.

Burnet is Guest Professor of Microbiology at Melbourne University, and his speech is entitled "The Speed of Change: The Quandary of a Human Biologist."

Speakers will travel from Japan, England, Canada and the U.S. for the conference which ends May 26.

The conference is sponsored by the Australian Computer Society, Inc., Box 1235 GPO, Brisbane, 4001.

## Calendar

June 6-8, Park City, Utah — Mid-year session on "The Real World of OCR," sponsored by the OCR User Association, 9415 South Western Ave., Chicago, Ill. 60620.

June 6-8, San Francisco — 1972 SID International Symposium and Exhibition, sponsored by the Society for Information Display. Contact: Lewis Winner, 152 West 42nd St., New York, N.Y. 10036

June 12-14, New York — Third International Congress on Advances in Automated Analysis. Contact: Department R34, Technicon Instruments Corp., Tarrytown, N.Y. 10591.

June 14-16, Atlanta — Fifth Annual Conference of the College and University 1130 User's Group (Cuetug). Contact: James C. McDonald, Director, Cuetug, Jacobsen Computer Center, Morningside College, Sioux City, Iowa 51106.

June 15-17, Toronto — Tenth Annual Conference of the ACM Special Interest Group on Computer Personnel Research. Contact: Fred A. Gluckson, EDP Systems Department, National Bank of Detroit, Detroit, Mich. 48226.

June 21-23, Chapel Hill, N.C. — Computer Program Test Methods Symposium, sponsored by ACM Sigplan and the University of North Carolina Computation Center. Contact: William Hetzel, Symposium Chairman, UNC Computation Center, University of North Carolina, Chapel Hill, N.C. 27514.

June 27-30, New York — DPMA 1972 International Data Processing Conference & Business Exposition. Contact: Richard H. Torp, Conference Director, Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

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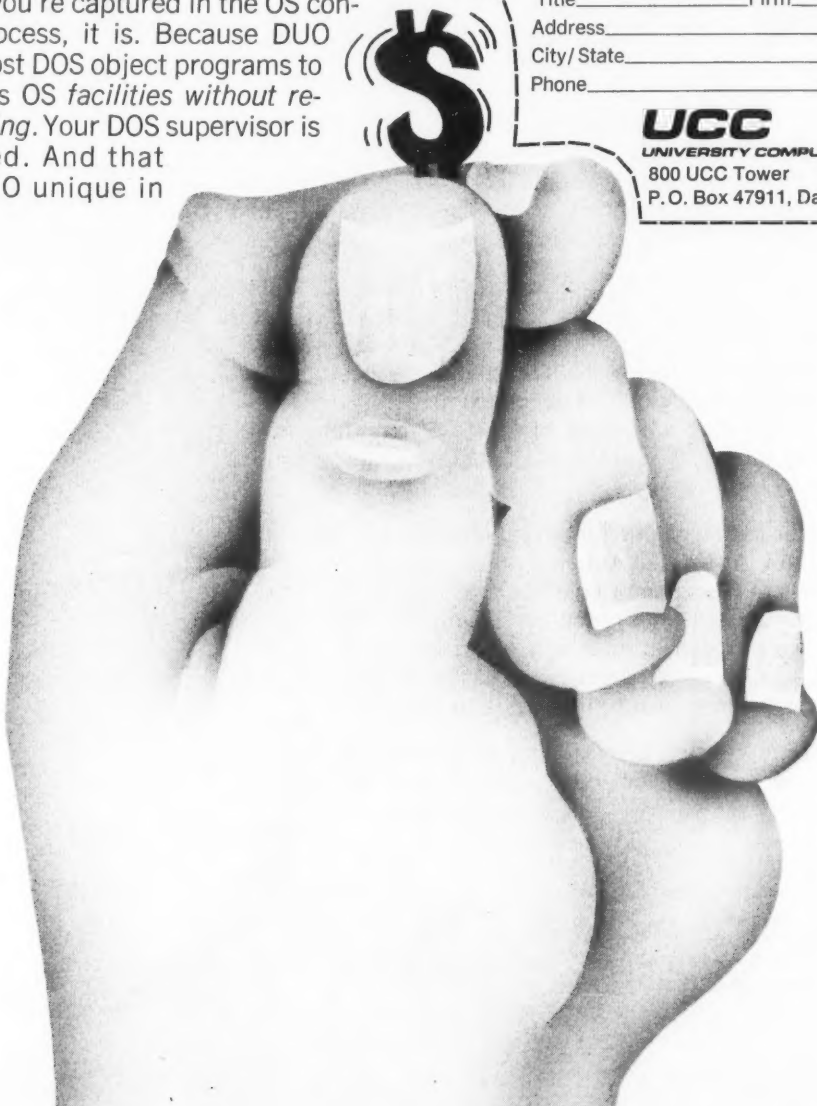
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In each of nine cities, local  
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cording to the region in  
which they contributed.

Computerworld also thanks  
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mand, for serving as back-up  
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## County-Level DP Always Multifaceted Experience

By Molly Upton  
Of the CW Staff

PITTSBURGH — Data processing at the county level has already netted Allegheny County over \$1 million, and Thomas R. Jordan, director of the county bureau of systems and computer services, hesitated to guess the anticipated yearly savings, since the system is constantly growing.

Through auditing personal property tax returns by comparing Internal Revenue Service tapes with those containing state property tax filings, the bureau uncovered about \$750,000 owed in delinquent taxes on 15,000 accounts. Jordan estimates this procedure will generate about \$300,000 each year in similar accounts.

The voter registration system, which is also handled on the 360/40, generated a one-time savings of \$300,000, and, he noted, the department employs 40 fewer people now than a year ago, through attrition.

### Criminal Justice System

A criminal justice system traces the processing of criminal data through the police to the courts. Savings of about \$225,000 are anticipated, Jordan said.

In September, a terminal will be installed at the Criminal Division Clerk of Courts. The system is part of the Law Enforcement Assistance Administration network.

Purchasing has been tied into appropriation accounting, providing overall monitoring of procedures, from writing purchase orders and capturing vendor information, to applying the transaction to the appropriate account.

The system also is linked to the county hospital. "Where we really scored was the ability to produce an actual per patient cost for third parties, such as Blue Cross-Blue Shield and the federal and state governments," Jordan said. "It's generated quite a bit of third-party recipient money coming in."

The property tax files have been converted, and billing will be put on the computer. The clerical work in the assessor's department is currently being automated.

Jordan cited as an asset the lack of any previous system. "We weren't tied down with previous system development. It was all done manually or by EAM before. We started with bare facts and didn't have to undo something somebody else had been building over the last 20 years and gotten themselves fouled up in," he said.

The system's capabilities have generated such interest from municipalities that the center is looking into the feasibility of performing tax billing on a service basis.

The assessment values of property are set by the county, and "we would apply their local millage, for school districts and municipalities, to our assessment. It's a mere matter of applying their millage to the system and producing the tax deck," Jordan said.

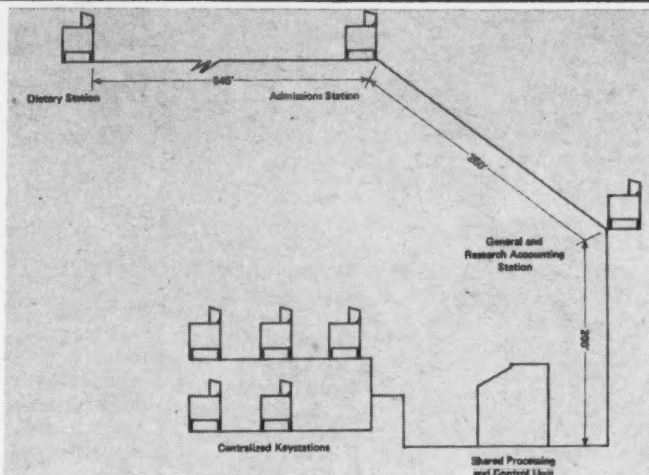
## 3-Dimensional Studies Are for the Birds

FAYETTEVILLE, Ark. — "Biologists are a long way from understanding the complexities of natural communities. But, by using a computer and a visual display device, I am trying to make multiple simultaneous comparisons of relationships among birds in an attempt to view the complexities in a new and meaningful way."

That is how Dr. Frances C. James of the University of Arkansas Museum describes the research she is pursuing with the help of the university's computer and a CRT terminal.

"I am comparing bird populations in two tropical forests and two shrubland areas," she said. "Using data from field observations in West Africa and Panama, I am finding that three-dimensional descriptions of the widely separated areas disclose some highly useful relationships."

"It is possible by projecting three-dimensional drawings on the CRT terminal to view the relative positions of all of the birds that live together in a tropical forest. Birds that fulfill the same ecological roles will fall in the same position on the plot regardless of their ancestry or geographic distribution."



Layout of Inforex System at Medical Center

## Dispersed Stations 'Center' Data

KANSAS CITY, Kan. — To achieve benefits of source data capture, the University of Kansas Medical Center is making novel use of a key-to-disk data

entry system. Three of the system's eight key-stations are installed at remote locations away from the DP room to handle hospital admissions, dietary and

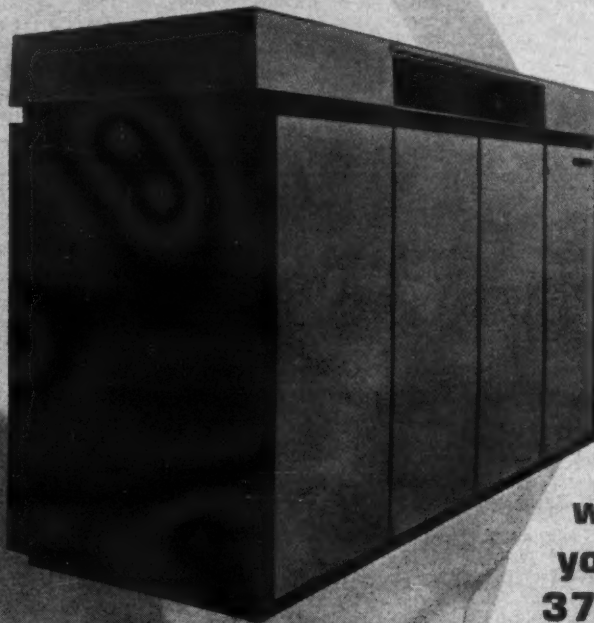
general accounting and research accounting functions. The remaining five stations perform routine data entry in the central area.

Whether assigned to remote or central locations, operators at each keystation independently enter data by cable directly into a shared processing and control unit. Data is stored in a disk, automatically pooled and verified before being transferred periodically onto magnetic tape.

Dispersed keystations simplify data entry by eliminating one step in the process. Data formerly had to be transferred from a manually originated document preparatory to keypunching, then actually keyed onto cards; now the data is keyed directly into the Inforex system from the original document.

The amount and type of knowledge for efficient management also came into consideration in deciding whether to disperse keystations at the Center.

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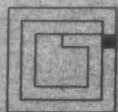
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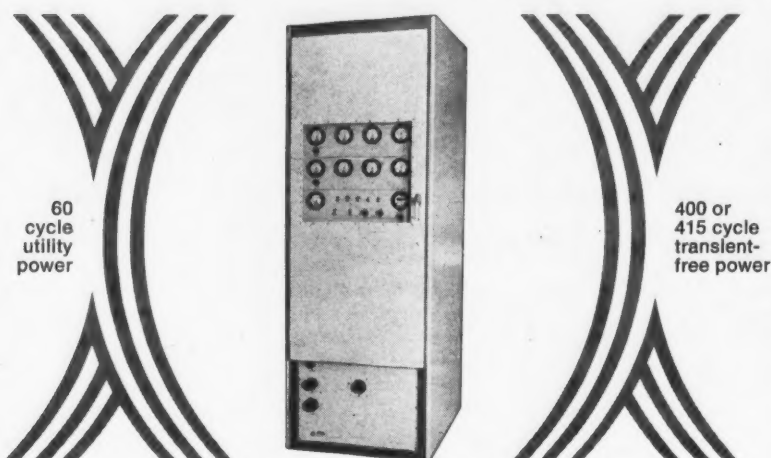
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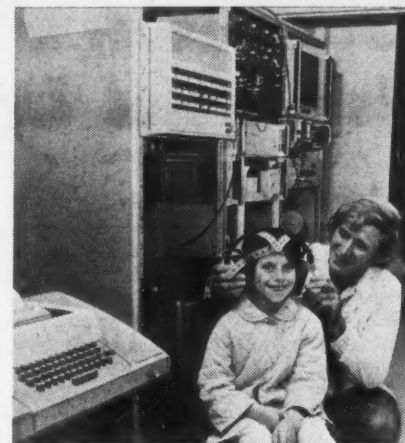
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## Computer 'Averages' Hearing Responses

MELBOURNE, Australia — As part of its research into nose, ear and throat diseases, the Department of Otolaryngology of the University of Melbourne is using a computer in an experiment to determine objectively the hearing range of uncooperative patients such as children.

Although a patient in a soundproofed room may be absorbed in reading or other activity, the brain's response to different tones fed into his earphones can be measured through a series of external electrodes on the skull and then "averaged" for immediate video display on the computer.



Electrodes record brain's response to sound; computer averages it.

## Toxicology Data Base Network Expanded

BETHESDA, Md. — A nationwide, on-line communications service will now allow research scientists and other health professionals direct access from remote locations to the National Library of Medicine's extensive collection of computerized toxicology information and data.

The Toxicology Information Program of the National Library of Medicine, National Institute of Health, U.S. Department of Health, Education and Welfare, has compiled the data base, and Informatics Inc. will operate the service.

Called Toxicon (Toxicology Information On-Line Conversational Network), the system offers subscribers an immediate search of the computerized toxicology data base compiled and maintained by the Toxicology Information Program of the National Library of Medicine.

This expanding data base is a major source of published human and animal toxicity studies, adverse drug reactions, poisoning cases, effects of environmental chemicals and pollutants and analytical methodology.

The Toxicon network already has entry points in nearly 40 U.S. cities.

## Aussies Want Licensing, Control of All Data Banks

Special to Computerworld

CANBERRA, Australia — Federal action is needed to control the spread of data banks, according to the attorney general's office.

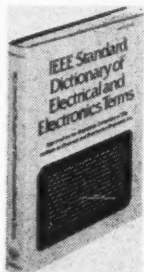
A New South Wales member of State Parliament, Peter Coleman, also agreed there was a need to regulate or control the activities of persons who amassed data about the private lives of others.

Coleman called for the registration, licensing and control of all data banks operated by public authorities, credit bureaus, private detective agencies and persons who offered such data bank information for sale.

Inquiries revealed a man had been black-listed on credit lists because he had never had a credit account and there was no information available on his credit rating.

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## University Expands Control Programs

# On-Line Systems Flourish Under Teleprocessing

By William E. Walden

Special to Computerworld

PULLMAN, Wash. — Data processing people in a university environment today are not so concerned with finding ways to keep a computer busy as they are with how to make available computer facilities handle the growing demand for services.

At Washington State University, a computer control program designed primarily for commercial application has been put into effect, and is successfully controlling the university's growing number of on-line information systems.

The result is that many separate teleprocessing systems can run concurrently on one computer, with a minimum requirement for core storage.

Called Customer Information Control System (Cics), the system functions as an interface program between user-written application programs and OS/360. Under Cics, separate on-line programs do not require their own teleprocessing systems, and a smaller amount of dedicated core storage is needed for each program.

The on-line systems presently running under the Cics teleprocessing monitor include an extensive library book acquisition system, student records, student accounts, a computer-assisted instruction program, a text-editing terminal system and an abstract retrieval system used jointly by WSU's plant pathology department and the U.S. Forest Service.

### Library Acquisitions

The library book acquisition system is the heart of the university library's technical services operation. At present, the system is concerned only with the ordering of books; however, plans are in progress for expanding the system to produce catalog cards and book labels, and to handle other technical service jobs.

Actually, the acquisition system is just one segment of an overall system design that will eventually encompass all technical and patron services of the library.

Entry of book orders to the computer is made through three IBM 1050 terminals. From the purchase request form, operators input all pertinent ordering data, including title of the book, author, publisher, estimated price, purchase order number, name of vendor and departmental budget code.

The computer collects and stores this order data during the day, and during the night batch processing cycle produces the purchase orders in vendor number sequence.

As a byproduct of the order entry process, the computer also produces punched cards which become book ID cards. These cards are filed until the books are received, whereupon they are pulled and become input to the computer to record the receipt. They are eventually placed into a pocket in the book and are used thereafter in conjunction with the library's system of IBM 357 badge-card reader terminals for circulation control.

When the invoice for a book is received and verified as correct, a 1050 operator in the acquisitions department inputs the invoice number, amount, postage, handling costs, tax and any other pertinent data which the computer uses to produce a monthly receiving report, authorizing payment of the items listed.

At the same time, the computer produces a set of punched cards which go to the university controller along with the receiving report. These cards are used by the controller as input to the computer for periodic batch production of the checks to the vendors.

Each day the computer makes use of its stored order and receipts data to produce a printed report that lists, by title, all of the orders placed the previous day and all books received that day.

The acquisitions department also has the capability for on-line inquiry of

orders and receipts through the 1050 terminals.

The on-line acquisition system has greatly speeded the book-ordering procedure, and makes it possible to handle a large volume of orders with a minimum of clerical people.

### Less Core

A major advantage of Cics can be seen in that the previous acquisition system required some 115K bytes of core storage, while the upgraded version runs in less than 50K bytes. Now, further expansion of the system is anticipated.

In the field of computer-assisted instruction, the university has demonstrated that a comprehensive on-line CAI system can be run successfully on a general-purpose computer along with a wide range of other on-line as well as batch work.

Typically, CAI systems have been run on dedicated computers; however, at WSU a

limited CAI program now runs on the 360/67, along with other teleprocessing programs.

Backed by grants from the National Science Foundation and the Northwest Regional Educational Laboratory, WSU established a pilot CAI program involving two high schools. Teletypewriter terminals which are on-line to the computer were installed for this purpose at a high school here and at one about 40 miles away.

WSU's intention is not to attempt to use CAI as a substitute for classroom instruction, but for supplementary teaching in specialized non-credit subjects that are not offered as regular courses.

### Abstract Retrieval

The most recent large on-line system to be placed into operation at WSU is an on-line abstract retrieval program, which is being conducted by WSU under a re-

search contract with the U.S. Forest Service.

The system is aimed primarily at providing scientists at 19 research centers throughout Washington, as well as WSU's plant pathologists, with on-line access to abstracts of articles that have been published in various journals on the subject of blister rust and other plant pathology matters.

The researchers retrieve abstracts that are appropriate to their needs by inputting simple expressions using Boolean logic. For example, a typical input expression might be: susceptible and white pine and blister rust.

The computer would then pull out and separately list the titles of all abstracts which refer in any way to all of the words "susceptible," "white pine" and "blister rust."

W.E. Walden is director of the computing center at Washington State University.

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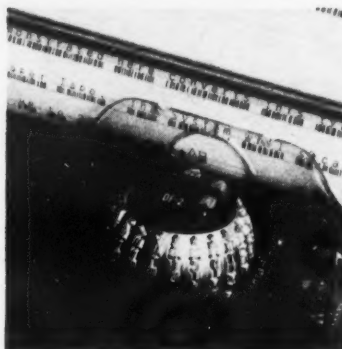
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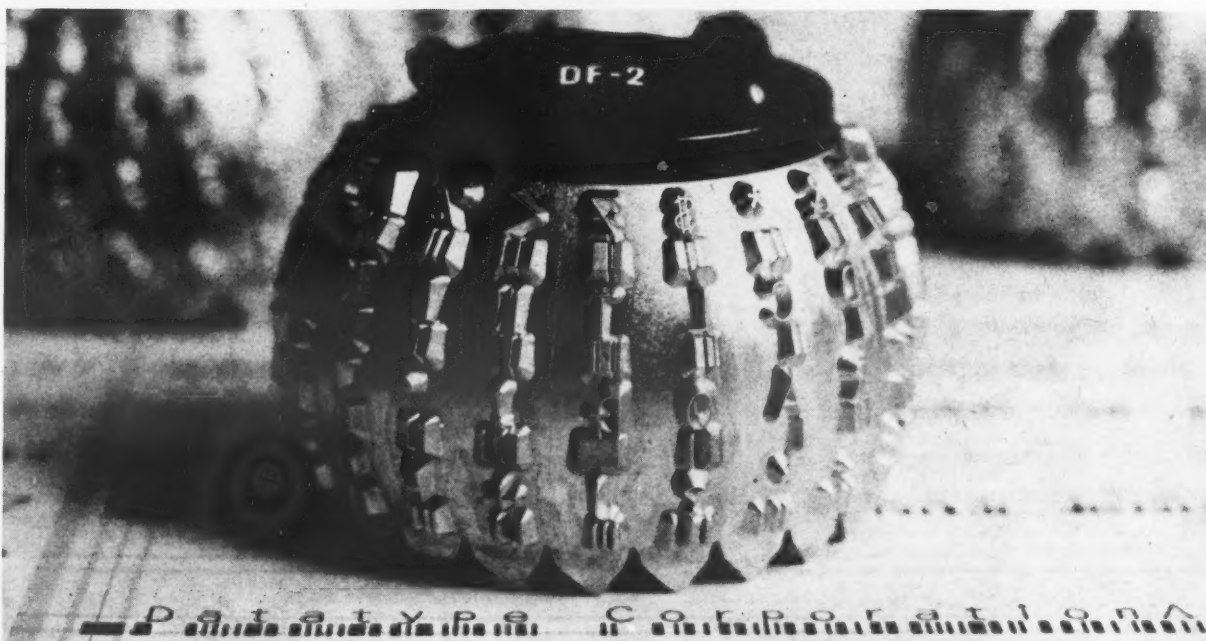
We've got a substantial base of satisfied customers already. And we're getting more every day. Why not give us a call soon? Or come check us out at the Spring Joint?

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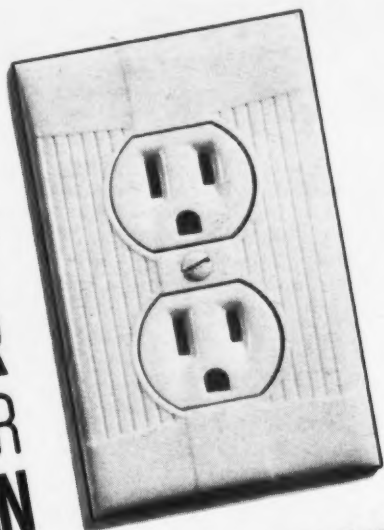
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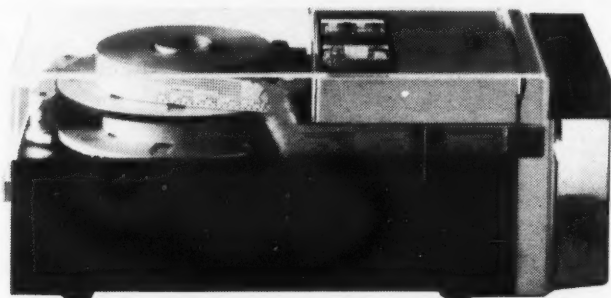
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## Dissemination of Computer-Based Education Programs Under Study

PORTLAND, Ore. — Oregon State University will participate in a national study to find ways to more effectively disseminate computer-based curriculum materials developed for use in higher education.

Dr. Larry Hunter, director of the computer center, will head the study at OSU. Other participants are Dartmouth College, the University of Iowa, North Carolina Educational Computing Service and the University of Texas.

The two-year, \$1 million study, supported by the National Science Foundation, has been funded for the first year. OSU's share will be \$162,000.

The OSU faculty, with support from NSF, has done research in developing educational programs utilizing the computer. Major work has been in statistics, physics and mathematics. A current program seeks to use computer graphics to more effectively teach undergraduate science courses.

The computer center is the heart of a

statewide educational computer network in Oregon which over the past five years has involved 74,000 students at 18 colleges and universities. With remote consoles tied directly to the OSU computer, other Oregon campuses can use the full computing resources of the center.

Hunter said the national effort, "Conduit," is essentially a feasibility study to determine whether or not computer-based educational programs developed for specific institutions can be used at other institutions.

The national study will seek to catalog and document available programs; disseminate materials to the nation's universities and colleges; test the transportability of materials from one computer environment to another; and evaluate the effectiveness of these materials in class.

## Irma Gets the Goods

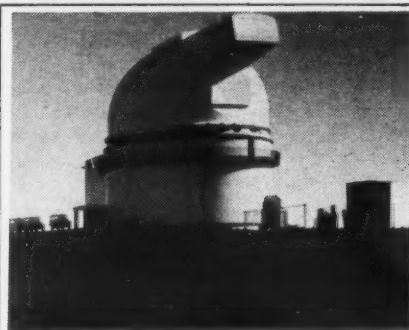
SAN FRANCISCO — Irma has taken on another task for the air traveller. She now looks for lost luggage throughout the Hughes Airwest system.

Irma (Instant Reservations Made Accurately) is a high-speed computer used by Hughes.

"Last year, the airline handled more than 4-1/2 million pieces of luggage," said Arch Miller, director of reservations and passenger systems for the company. "Errors occasionally occur. They amount to a fraction of 1%."

Irma takes information from the passenger and information from the station agent, puts it together and comes up with the location and routing of the lost bag.

Irma can identify 99 different bag types and every different bag color.

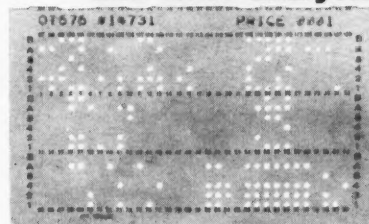


## Star Gazing

Mauna Kea Observatory, the world's highest, is situated atop an inactive volcano on the island of Hawaii. Its location near the equator and its altitude of 13,796 ft make for near-perfect viewing conditions. The main telescope is directed by a computer that moves the scope into a particular viewing position, then keeps it locked onto a specific star.

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## Rivers and Roads Are a Hot Topic Here

BRISBANE, Australia — Two subjects important to the future of Southeast Asia — road construction and river pollution — are being closely studied in Australia.

The work is being carried out under actual tropical conditions in far north Queensland by researchers at James Cook University, Townsville.

A computer model of the nearby South Johnstone River has been set up at the university for the pollution investigation; and the roads study covers hundreds of miles of roads used by trucks in northern Australia.

The South Johnstone River, which flows through the northern sugar town of Innisfail, was selected as a typical tropical river subject to pollution from industrial and household waste.

All conceivable data on the river's size, shape, flow and depth was fed into a computer.

With the data base, operators then fed the model river various pollutant information.

"From this, we are able to determine just how much pollutant — and of what type — any river can absorb," engineering professor Dr. David Hugh Trollope said.

"Once having obtained the necessary basic information, we should be able to advise any tropical country as to the state of its rivers, and suggest the actual steps that should be taken to relieve the situation."

"In other words, the idea is to optimize urban and industrial development," he added.

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## Terminal System Traces Freight

WILTON, Conn. — Emery Air Freight's new audio response system, through normal telephone channels, will provide shippers with an instantaneous verbal report on the whereabouts of their shipments. Shippers and consignees, utilizing an audio response terminal, can now communicate directly with Emery's Emcon computers here.

A company spokesman said up to 90% of the information cus-

tomarily sought in the tracing of shipments will be instantly and directly available to Emery clients via voice link to the computer.

The system provides customers with the pertinent facts on every shipment in the system.

Such information as current status, flight departure and arrival, commodity, weight, time elapsed from pick-up, total time in transit, number of pieces and if the shipment is currently out for delivery is given.

The only information required by the shipper is the number of the Emery airbill, a copy of which is given to the shipper on pick-up. When the special number, linking the customer directly to the computer is dialed, the computer responds requesting the shipper to enter the airbill number. Once entered, the computer describes the shipment and its status.

The system not only maintains a running diary of each shipment, but also catalogs rates, does billing, issues cargo manifests, alerts receiving cities; and issues special instructions on handling; measures the quality of service; analyzes traffic patterns; and selects the most advantageous routings for efficient and rapid shipment handling.

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## SIMULATION IN URBAN MANAGEMENT AND PLANNING

June 4-6, 1972

Sugarloaf Conference Center  
Temple University  
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### Topics Covered

**PROMUS** — The Provincial Municipal Simulator is a complete urban management system developed by D. Blumberg and others at Decision Sciences Corporation for the City of Toronto and the Province of Ontario. It represents the broad range of economic and social processes in cities, and provides a working tool for improved decision making.

**NUCOMS/PUDS** — The New Community Simulator and the Planned Unit Development System have been created by the staff of Decision Sciences Corporation to meet the need for effective evaluation of large scale development proposals. NUCOMS is now being implemented for the U.S. Department of Housing and Urban Development, and along with PUDES, is being used on a number of specific projects throughout the country.

**TeleCLUG** — This land use exercise was originally developed at Cornell and has since been computerized by Dr. M. Whithead at Temple University. It shows how cities develop through a multitude of individual decisions, and how comprehensive planning can be used to produce more desirable development patterns.

**BUILD** — This urban management exercise was developed by Dr. A.J. Pennington and J.A. Orlando at Drexel University and Decision Sciences Corporation. It represents the interactions of budgetary decisions concerning redevelopment of the inner city, and has been used to train students at various universities, Model Cities Program Administrators, and others.

### WHO SHOULD ATTEND

The workshop provides an opportunity for professionals in a variety of computer and systems oriented disciplines to become familiar with the state-of-the-art in urban simulation. For further information please write:

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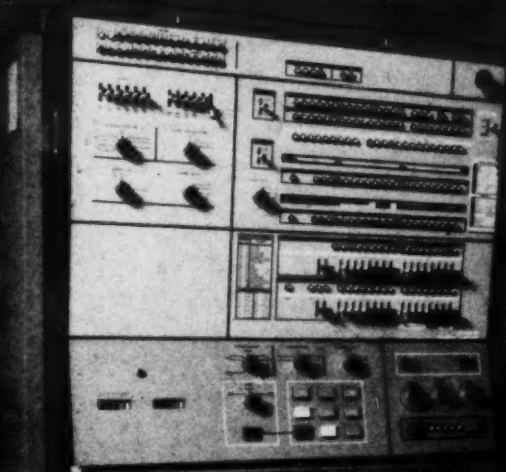
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<sup>\*</sup>Cited in *Datapro Research*, Nov., 1970.



# computer industry

a Computerworld news section about the nation's fastest growing industry

May 17, 1972

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## CI Notes

### Exports Continue Up

WASHINGTON, D.C. — U.S. exports of computer equipment topped the \$115.9 million mark in March, according to the Department of Commerce's Bureau of the Census.

The March figures, almost \$25 million ahead of the \$91.4 million in February exports, brought the value of exports for the year up to \$300.2 million, the bureau said.

Western Europe continued to be the largest market for equipment, receiving computer shipments valued at \$170 million so far this year.

### Unicon Accepted at Nasa/Ames

PALO ALTO, Calif. — Precision Instrument Co.'s Unicon laser mass memory has been installed and will be in operation at the Nasa/Ames facility. Nasa/Ames has been granted options for three additional systems to be ordered within the next 15 months.

### 'First' 768K 360/50 Reported

STAMFORD, Conn. — Computer Investors Group, Inc., exclusive marketing organization for Data Recall Corp., increased the mainframe memory capacity of a major automobile manufacturer's IBM 360/50 computer to 768K with Data Recall memory.

This memory system also features expandability to 1,024K and contains an off-line switch which disconnects the memory from the CPU, permitting maintenance without closing down the entire computing system, the firm said.

### Supershorts

Donald R. Cruzen, director of exhibits for the last ten joint computer conferences, has left his Afips post to form David Rogers Corp., an international show management firm.

Boothe Credit Corp. has agreed to purchase over the next 15 months up to \$5.4 million of equipment from Entrex, Inc. for lease to Entrex customers.

Antekna, Inc. has formed a nationwide sales representative organization to market products designed and manufactured by its Data Comm Division.

Four-Phase Systems shipped a record \$1 million worth of intelligent terminal systems in March, just one year after delivery of the company's first system.

## Study Finds Trend

# Mainframe Customer Loyalty Up in '71

By a CW Staff Writer

NEWTON, Mass. — Customers were more loyal to their mainframe makers in 1971 than in 1970 and it appears the trend is intensifying with greater loyalty expected in 1972, according to International Data Corp. (IDC) here.

In its sixth customer loyalty study, IDC found that although users stretched their DP dollars during the economic recession by turning to independent peripherals makers and leasing companies, they still

remained loyal in the type of computer installed.

During 1971, IBM experienced the highest number of defections to other suppliers, but also achieved the highest gains from users disloyal to other mainframe manufacturers for an overall loyalty rating of 82%.

Most of the defection from IBM went to Honeywell equipment (33%), with NCR picking up 22% of the defections, Burroughs 16%, RCA 11% and Univac 10%.

IBM, however, picked up 76% of the users who defected from NCR, almost as many from Univac, 52% of the disloyal Honeywell customers and 50% of the users moving away from Control Data.

The company with the highest loyalty rating continued to be Burroughs, which had a rating of 86% during 1971, up from the 80% it registered in 1970.

Burroughs will lose its first place rating in 1972 to IBM, however, according to forecasts made by IDC.

The firm predicted that IBM will have a loyalty rating of 94% during the year, while Burroughs will have a rating of "only" 91%.

Honeywell followed Burroughs and IBM on the list as the company with the most loyal customers with a 79% rating, followed by NCR (76%), Univac (61%), and RCA (56%).

Next year, the study predicted that NCR's share of loyal customers will rise to 82% while Honeywell's will drop slightly to 75%.

### 50% for Univac

Former customers of RCA will show a loyalty rating of only 46% next year, according to the study, while Univac users will show a rating of only 50% in the coming year.

"There is a definite relationship between age, type of computer and loyalty," the firm said. "IBM's 1620, first installed in September 1960, has the lowest loyalty rating of all IBM systems — 45%."

At the same time the firm found that "all System 360 users are loyal. Ratings range from a 'low' of 81% for the 360/20 up through the 360/25 and 30 at 88% and the 360/50 with 90%."

The health care field was the most loyal to non-IBM vendors with a rating of 92%, while their weakest areas were agriculture, mining and construction and non-professional services, which showed ratings of 50%.

IBM managed to garner 64% of the new computer sites in 1971, up from 59% of the new users in 1970, according to the study.

NCR was second when it came to signing up the first-time user, with 15% of all such sites, slightly down from 18% of new sites in 1970. Honeywell was third in signing first-time users with 10% of these installations, followed by Univac and Burroughs.

Of the first-time users, 37% opted for the IBM System 3, while 10% went for the NCR Century 100, 8% to the IBM 360/20, 7% to the Honeywell 115 and 6% to the Univac 9200.

## Cambridge Memories DOT Units Called Cheaper Than Bulk Core

NEWTON, Mass. — This summer will see the first deliveries by Cambridge Memories Inc. of a data storage device that could replace disks, drums and bulk core stores at lower cost and with higher performance.

Although not as dense a medium or as low in cost as the bubble technology which it resembles, DOT (Domain Tip propagation logic) has been perfected and is available now, the firm said.

The first products using the new technology are being demonstrated by Cambridge Memories at the SJCC.

DOT, like bubble logic, uses magnetic

domains that circulate through channels of magnetic material. A major difference is that the DOT uses readily available materials in a relatively simple fabrication process.

Aluminum is deposited onto a glass substrate, then photoetched to define the data tracks. Magnetic material (nickel-iron-cobalt) is then used to coat the aluminum. The domains travel through the magnetic material steered by the aluminum channels.

The resulting closed recirculating device has non-destructive readout and is non-volatile, especially important to users of large data bases, according to Dr. Robert J. Spain, director of research.

Average access times in current units are about 4 msec. The data is block oriented with an access time of under 1  $\mu$ sec/block. Units with average access times in the vicinity of 1 msec are currently in the developmental stage, according to Spain.

The firm is currently offering two versions of the DOT. The Dotram 16 is intended for such applications as the replacement of rotating memories, bulk core and tape cassette drives.

Word length is available from 8 to 36 bits with access random by block, serial by word. Capacity can range from 65K to 16M bits. Data transfer rate is 2 MHz.

The Dotram 4 is a slower version using a 4-bit word intended for use as an inexpensive memory in such applications as terminals, calculators and point-of-sale devices. It is available in a field-expandable range of sizes from 40K to 320K. Data transfer rate is 200kHz. The price of the Dotram is about 40% to 50% that of core, Spain said.

The overall cost for DOT units ranges from one-tenth to one-quarter of a cent/bit, according to Spain, comparing well to the disk drives it is intended to replace.

## Norris, Macdonald Predict 15% Growth Over Next 5 Years

NEW YORK — "I expect computer industry growth over the next five years to be from 12% to 15% annually domestically, and 15% annually overseas," noted Ray. W. Macdonald, president of Burroughs.

William C. Norris, president of Control Data Corp., agreed with the estimate, and suggested that the data services segment of the industry should show the fastest growth, "about 20% to 25% annually domestically and even higher overseas."

The two computer industry executives spoke at the Fifth Institutional Investor Conference here recently.

Norris pointed out that the data services industry is not dependent on an installed customer base, and is a key to growth in obtaining new customers. Noting the trend towards emulation, he said it is neither effective nor efficient on large systems.



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## Univac Set To Keep RCA Series 70

BLUE BELL, Pa. — Univac's Series 70 Operations is making a determined effort to retain the major portion of the \$1 billion general-purpose computer base acquired from RCA by Sperry Rand under the Dec. 17, 1971, purchase agreement, according to John C. Butler, vice-president of Series 70 Operations.

Stakes are millions of dollars a month in revenue currently generated by the customer base, he said.

About 400 software support personnel at the 177,000-sq-ft Series 70 systems programming facility in Cinnaminson, N.J., maintain and enhance software in the field. Enhancements include the VMOS (TSOS) operating system for virtual memory users, and the TDOS and DOS systems for real memory users. They are also developing the software for future conversions to other Univac equipment, such as the Univac 9700 or 1100 Series.

The Cinnaminson facility includes two Series 70/7s, a 70/46, a 70/45-II, a 70/61 and a 70/3. Also at this location is the Series 70 systems support office with



Main spare parts center for Series 70 operations contains 25,000 items.

28 customer engineers ready for emergency consultation.

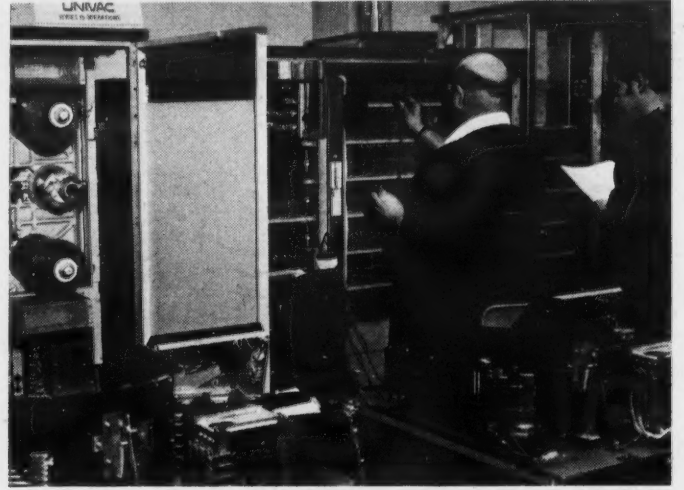
Series 70 Operations also include about 1,300 customer engineers acquired from RCA along with a complete customer engineering education center in Cherry Hill, N.J. The center includes a completely equipped professional television studio which produces video instructional tapes.

The series 70 "parts central" activity, which can provide any of 25,000 spare parts to any location within four hours, is also at Cherry Hill, along with a complete parts repair and equipment refurbishment facility, according to Butler.

The Federal Government, state and local government, utilities, and manufacturing users are the largest Series 70 customer groups.



Systems programmers at Series 70 facility discuss tape, disk utilization.



Technicians refurbish Series 70 tape station at Cherry Hill, N.J. plant.

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## Expansions

M&M Computer Industries, Inc., remote batch terminal manufacturer, has moved to larger facilities in Orange, Calif.

Documation Inc. is constructing a \$300,000 facility in the Palm Bay Industrial Park, Palm Bay, Fla.

Eldorado Electrodata Corp. plans to add 16,000 sq-ft to its Concord, Calif., headquarters.

PHI Computer Services, Inc. is moving to larger facilities in Tewksbury, Mass.

Microdata Corp. is constructing a 48,000-sq-ft plant in the Irving

Industrial Complex, Orange County, Calif.

Digital Computer Controls is doubling its plant capacity with the construction of a 16,000-sq-ft building in Fairfield, N.J.

GTE Data Services Inc. has moved to its new 36,000-sq-ft center in San Angelo, Texas.

ACTS Computing Corp. has established a branch office in Columbus, Ohio.

Comress has opened branch offices in Boston, Atlanta and Dallas.

### Large-Scale Users Told

## Honeywell-GE Merger Wisdom Proven

MONTREAL — Recent developments in the computer industry have confirmed the wisdom behind the merger of Honeywell and GE computer interests 18 months ago, C.W. Spangle, executive vice-president of Honeywell, told a meeting of large-scale computer users here recently.

"The withdrawal of RCA from the mainframe business, the get-together of CDC and NCR, and the European consortium of Siemens and CII all confirm our decision in 1970 that a marginal or geographic supplier simply

cannot afford the long-term costs associated with supporting complete current and future product lines," Spangle said.

Indicating that Honeywell's computer operations were profitable, Spangle stated: "Along with many other changes that have occurred in our industry in the past year and a half has come the realization that the computer user is taking an increasingly close look at the balance sheet of his supplier. No one wants to tie his future to a loser.

"Eighteen months ago many

people were looking at Honeywell to see if we could successfully accomplish the largest merger in the history of the computer industry. No one was looking harder or with a more skeptical eye than you large users.

"We have been successful in winning new business in the federal Government large-systems market," Spangle added. "The Wimmix contract of \$51.3 million and the Navy shipyards contract for \$12.9 million indicate to us the government's confidence in the system.

"One apparent concern has been our ability to build, deliver and install the 6000s that we've sold.

"We shipped 25 systems last year. We have already installed the first of the Wimmix systems, and the first of the Navy shipyards contract is due for installation this month. In every case we have had the system up and running in less than 14 days," he said.

### Overseas Orders & Installations

Pertec Corp. has received orders for its 3700 computer output microfilm (COM) system from: Fellsdata, Oslo; Volvo Data, Githenburg, Sweden; Banker's Automated Services, London; COM A.G., Berne, Switz.; Computrex, Toronto; Mitsubishi Office Machines, Osaka, Japan, and Japan I/O Controls, Tokyo.

Isuzu Motors, Kawasaki, Japan, has ordered a Burroughs B6700 for order process, inventory, sales forecasting, supply parts control, purchasing and engineering applications.

The Norwegian Postal Giro has leased an OCR/S2000 document processor from Recognition Equipment. The system will be used to process payment transactions. The Postal Giro provides account holders with a daily balance, including debit and credit specifications.

The Ministry of Planning of the Government of Iraq has ordered an NCR 200 system, for use by the central statistics organization.

The Regional Health Insurance Organization of Styria, Austria's third largest province, has ordered a real-time Univac 1106 for use as a medical information system.

The Gas and Fuel Corp. of Australia has ordered a B6700 dual processor system that will be used to handle accounting applications, including providing instant updates on customers' files.

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## Five Times 3300-Density Seen With New Magnetic Arts Unit

ESCONDIDO, Calif. — An advanced magnetic transducer capable of recording 1,000 track/in. has been developed by Magnetic Arts Corp.

Intended for use with most disk heads and helical scan tape systems, the device is a specialized version of the company's 4340 core.

The 4340 comes in a standard thickness of 2.1 mil allowing 400 track/in. recording, twice that of the IBM 3330. The 1,000 track/in. version has been processed so that its track is less than 1 mil, five times that of the 3330.

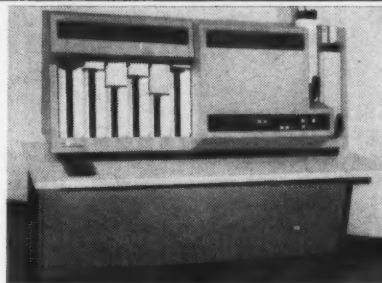
The 4340 is adaptable to most disk heads now in use, the company said. A spacer allows two cores to be mounted in

Northridge, Calif., are intended for signal analysis systems.

A new series of fast logic modules developed for the National Accelerator Laboratory by LeCroy Research Systems Corp., W. Nyack, N.Y., the LRS 364 and 365 Dual 4-Fold Majority Logic Units feature 150 Mhz operation in compact instrument design.

A MOS-encoded keyboard featuring "N" key rollover and a single 40-pin ceramic MOS chip for random-pair coding of up to 64 keys, is available from Controls Research Corp., Santa Ana, Calif., for general applications on computer communications and data entry terminals.

Tycom Systems Corp., Pompton Lakes, N.J., has announced a universal Ascii interface that permits the Tycom 35/37 Selectric-based typewriter to operate on

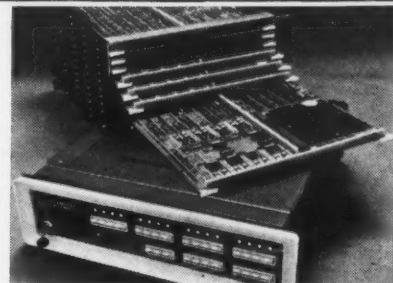


Decision Card Reader

the external I/O bus of many minis.

Featuring a read or write cycle time of 150 nsec, the Monostore II Bipolar RAM systems from Monolithic Systems Corp., Englewood, Colo., are supplied in capacities of 256 to 16K words with bit lengths from 1 to 96.

A 16-bit MOS ROM using P-channel technology, the EA4800 from Electronic Arrays, Mountain View, Calif., is organized in 2K by 8 bits or 4K by 4 bits and features a 1.2  $\mu$ sec maximum access time and a maximum power dissipation of .032 mW/bit. Prices of 100 quantity are



Computer Automation Memory Modules

\$52.50 for the silicone package and \$60 for the ceramic.

A monolithic integrated circuit chip, containing the complete digital portion of circuitry required for an 8-bit successive approximation A/D converter system, has been announced by Harris Semiconductor, Melbourne, Fla.

Applied Magnetics Corp., Goleta Calif., has announced the portable E-200 Disc Memory Exerciser with facilities for full on-site testing of the key parameters of the AMC M-200D Series Disc Memory Systems.

### New OEM Products

a single housing slot to achieve double-track densities without basic hardware changes. Gap lengths from 10 to 150  $\mu$ in. are available; standard tracks are 2.1, 3.4 and 4.3 mil. A single ferrite permits optimum performance from 1 to 15 MHz, the company said.

The 4340 core in initial quantities is priced at \$2.65, dropping to below \$1 in volume from the firm at 1310 Industrial Ave.

#### Decision Card Unit Out

HORSHAM, Pa. — A high-performance, fully buffered card reader and printing punch with dual input hoppers, common card path and six output stackers is being offered by Decision Data Computer Corp. to OEMs as a 96-col I/O device.

The inclusion of the 9650 in a computer system would enable it to perform such card-handling functions as 1,000 card/min reading, 120 to 420 card/min punching and printing, collating, reproducing, interpreting, sorting and gangpunching through a single unit, the company said.

The performance, characteristics and cost of the the 9650 compare favorably with the 80- and 96-col MFCUs (Multi-Function Card Units) available from IBM, the company claimed. The 9650 costs \$11,600 with a delivery schedule of six months from 100 Witmer Road 19044.

#### Other New Products

Automata Corp., Bellevue, Wash., has unveiled the low-cost Model 1600 manual-fed, motorized optical mark reader, and the Model 3800 card reader that scans both sides of a card as it passes the read station.

Sequential Instruments, Inc., Elmsford, N.Y., has introduced the Opti-Sensor Series OS-700 and OS-1250 of optical pickups that can replace magnetic pickups.

Three products from Monsanto Commercial Products Co., Cupertino, Calif., include a 7-segment light-emitting diode display with a .6-in. height in two fonts, the MAN6 and MAN66; the MCT2F phototransistor opto-isolator which is said to produce twice the gain/bandwidth product of any unit on the market, and the MANIO, a 7-segment alphanumeric display for high-ambient-light conditions, which uses a Gallium Arsenide Phosphide material.

The logic pen from Advanced Digital Research Corp., Mountain View, Calif., is a \$125 test tool designed to replace oscilloscopes for troubleshooting problems in digital equipment.

Cycon, Inc., Sunnyvale, Calif., has introduced a 3-1/2 digit BCD analog-to-digital converter module which is said to utilize novel circuit design.

Model 030 array processors for PDP-11 and Nova minis from Unicom, Inc.,

#### Model 236

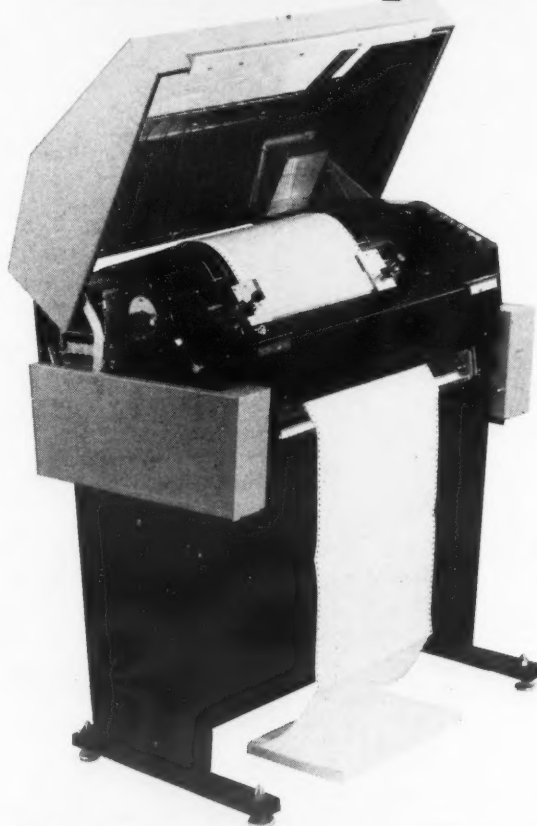
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## Applications-Oriented Systems Should Push Voice Response Market Growth

PENNSAUKEN, N.J. — The audio response equipment market will show rapid growth from a very small base of installations, according to a study by Alltech Computer Systems Inc. here.

At the end of 1971 the installed base of voice response systems was estimated at 650 units, the study says, and it predicts that the installed base will grow to a level of 3,900 units by the end of 1976 with most of the growth coming in the 1975-76 time period.

The "key to the growth of the voice response industry will be the introduction of more applications-oriented systems encompassing voice response techniques, CRT displays and hard-copy capability," the firm said.

IBM dominates the voice response market, according to the report, even though there are more than 40 companies presently supplying equipment. The most widely accepted product in the market is the IBM 7770 unit, it adds.

### CMC Takes Over Transamerica's Keylogic Base

LOS ANGELES — Computer Machinery Corp. has completed its arrangement with Transamerica Computer Co. under which it has taken over the installed base of Redcor Keylogic systems owned by Transamerica [CW, April 19].

Under the deal, Transamerica will buy approximately \$12 million of CMC equipment with a monthly rental of around \$295,000.

CMC will receive about 50 Keylogic systems generating rental revenue of around \$140,000/mo. In addition, Transamerica will pay \$7 million in cash to CMC. Transamerica purchased the Keylogic equipment in 1971 from Redcor.

The majority of systems in use today are within the banking industry, primarily for account status. Other systems are used for credit verification and telephone company applications with customer order entry and inventory control applications becoming increasingly important.

The growth of the industry over the next two to three years is expected to start at an estimated 20% in 1972, and grow at an estimated 10%/yr thereafter, without the impetus of a large, independent company, and none is currently foreseeable, the firm says.

This will result in an installed base of around 1,520 units by the end of 1974, it adds.

However, by 1975 the industry

is expected to enter its growth phase.

At that time there will be a broad base of communications capability both in the installed base of computer systems and in the available transmission techniques; widespread availability of necessary telephone equipment; and a widespread demand for these techniques from users, the report states.

"This growth period can be expected to be rapid and intense, requiring large amounts of resources," Alltech feels.

"Because of the large potential use for voice response techniques, this growth period can be expected to last until 1985, and beyond, as voice input techniques are merged with voice response systems."

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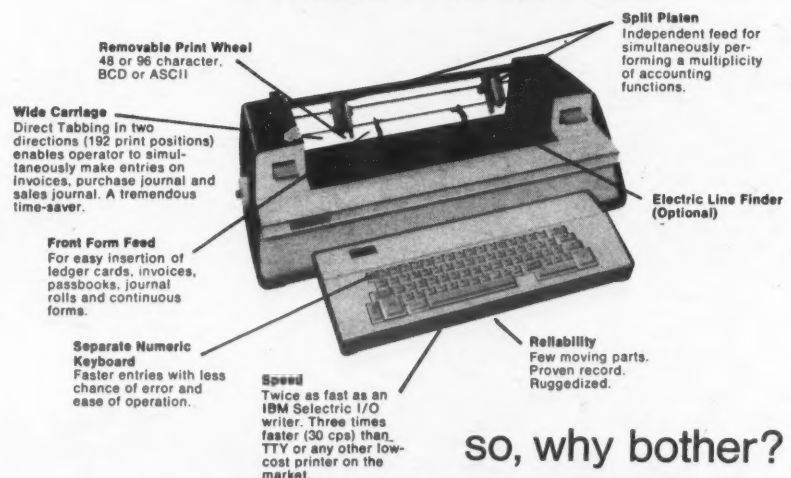
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## Age of Dedicated Minis Predicted

By Edward J. Bride  
Of the CW Staff

NEW YORK — The trouble with the software industry today is that "it's difficult to find a company that can write difficult software," observed Charles P. Lecht, president of Advanced Computer Techniques Corp. (ACT).

ACT is a software and management consulting house here specializing in compilers and operating systems.

Lecht is a strong believer in minicomputer technology, and apparently believes the predictions that applications programmers will continue to decrease in numbers.

By the end of this decade, large-system research and development may be "by order only," and consumer-type research will be concentrated on small systems, he commented.

"I am a firm believer in programming a small system once, then using it for one, dedicated application," he noted.

Lecht foresees the day when large corporations will have small systems for each department, with one central minicomputer for data base management.

In the nearer term, large systems may satisfy the needs of companies with centralized management and administration, he conceded. His company was chosen (with GE) by the Port of New York Authority to develop the computer capabilities of the World Trade Center (WTC).

The project includes establishment of "Interfile," a data base pertaining to international commerce and trade, and intended to facilitate international business for WTC tenants.

Tenants of the huge complex can install terminals to two GE

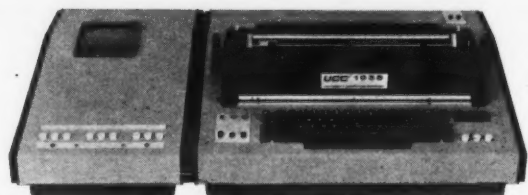
time-sharing systems (Resource and Time-Sharing), or use the WTC Information Center as a service bureau, and access either of those systems in the same manner.

### 'Symbiotic Union'

Lecht stated that people cannot deal with computers unless they look on them "in symbiotic union" with their human counterparts.

Taking away his philosophy that "human protoplasmic flesh" is part of a computer system, the practical fact is left: managers cannot improve their own hardware efficiency without looking at the computer's relationship with operators and programmers, he said.

He has also suggested that users about to experience the demomital of DOS may have a legal case against the vendor, if their request for proposal included continued support of their operating software.



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## Orders and Installations

Two hospitals and a clinic have installed NCR Century systems to handle financial transactions. Northwest Texas Hospital is using a 200, High Plains Baptist Hospital, Amarillo, Texas, has a 50 and the Nalle Clinic, Charlotte, N.C., uses a 100.

Pansophic Systems Inc.'s Panvalet Direct Access Library System has been installed at GTE Data Services Inc. The system will be used to standardize data library activities.

Computer Micro Services, Chicago, has ordered Pertec Corp. computer output microfilm systems for installation in service bureaus in Chicago, Detroit, Indianapolis, Milwaukee and St. Louis.

Three colleges have ordered or installed Univac systems for academic and administrative use. Mercer University, Macon, Ga., has ordered a 9200. The Community College of San Antonio, Texas, has installed a 9211B, and Lehigh County (Pa.) Community College has a 9311.

Modular Computer Systems has delivered its Modcomp Basic software to the U.S. Army Electronic Command, Ft. Monmouth, N.J.

Data Technology Inc. has ordered Control Data Corp. 955/SC1700 and 915/8092 page reading systems to provide optical character recognition services.

Applied Data Research Inc. has installed a computerized reservation systems for Amtrak, the national railroad passenger corporation.

Datacraft Corp. has received orders for four Series 6000 computers and peripheral equipment from: Wright Patterson Air Force Base; D.E. Britt, Associates; the University of Wisconsin Medical Science facility; and Kitt Peak National Observatory, Tucson, Ariz.

Brunswick Corp. has ordered a communications message-switching system from EMR Computer. The main element is an EMR 6135.

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## Nickels & Dimes

In the acquisition of Ancom Systems by Boothe Data Systems, the exercise price of Boothe Data Systems common stock purchase warrants has been reduced from \$2.50 per share to \$1.50 per share. U.S. Financial Systems, which owned 75% of Ancom, now controls about 66.7% of Boothe Data Systems common and 20% convertible preferred.

\$\$\$

Control Data may declare a "modest" stock dividend of about 5% at year-end if business conditions continue to improve, Chairman William C. Norris told stockholders.

\$\$\$

Delta Automated Systems, Inc. is closing its doors. In a

letter to stockholders, President Claggett A. Jones said the firm plans to file a petition for a liquidation bankruptcy in the U.S. District Court in Baltimore, Md.

\$\$\$

The Computer Equipment Division of Electronic Engineering Co. of California (Eeco) spent more than it earned, for a loss of \$132,000 in the quarter ended March 31.

\$\$\$

First quarter results at Electronic Memories & Magnetics were adversely impacted by startup costs and marketing costs of EMM's new core memory systems to end users. End-user sales were also less than expected.

## \$62.8 Million Deficit

# Computer Sciences Posts 1972 Losses

LOS ANGELES — Hit by a change in accounting methods, Computer Sciences Corp. (CSC) posted a loss of \$41.2 million for the fourth quarter and \$37.5 million for the year ended March 31.

Operating revenues for the year reached a record high of \$127.6

million, compared with \$114 million in 1971. Revenues for the quarter climbed slightly, to \$31.1 million from \$31 million in the year-ago period.

The decision to charge against earnings as of March 31 all development and start-up expenses for proprietary programs ac-

cumulated and deferred as of that date resulted in a deficit before tax credits of \$62.8 million in both the quarter and the year.

The conversion to the equity method of financing accounted for a \$4.1 million charge against 1972 earnings, compared with \$3.4 million in 1971. The 1971 earnings were restated.

In the quarter, CSC's loss totaled \$41.2 million, even after a \$23.4 million tax credit, compared with earnings of \$548,000 or 4 cents a share, in the same 1971 period.

CSC reported a loss of \$37.5 million for the year, after a tax credit of \$19.4 million. This compares with last year's earnings of \$2.9 million, or 22 cents a share.

## Sperry Rand's Earnings Fall 16% For Year, But Quarter Net Rises

NEW YORK — Sperry Rand Corp. ended its fourth quarter with a 15% increase in earnings, but noted a 16% decline in earnings for the year ended March 31.

The upswing in the quarter was accomplished despite a provision for about \$6.8 million, or 20 cents a share, related to plant closings and discontinuance of certain product lines in the office equipment and consumer product fields.

Earnings for the period totaled \$23.8 million or 69 cents a share compared with \$20.7 million or 60 cents a share in the same 1971 quarter. Sales rose to \$549.8 million, a 17.5% increase over \$468 million registered in the year-ago period.

For the year, earnings declined to \$60.8 million, or \$1.77 a share, from \$72.3 million, or \$2.11 a share in 1971. Sales rose 5% to \$1.82 billion from \$1.74 billion.

Adoption of the equity method of accounting for invest-

ments less than 50% owned increased earnings for both the quarter and the year by \$5.2 million, or 15 cents a share, the company said.

The year's earnings were affected by the slower-than-expected recovery in demand for capital equipment, noted Chairman J. Frank Forster.

## New VS-IV Bridges Man-Machine Communications Gap

### See preview of first low-cost, miniaturized voice synthesizer at computer conference

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The unit is a miniaturized, solid-state device weighing less than 5 pounds. Essentially, it is an electronic analog of the human voice, receiving the counterpart of brain signals to the larynx, and duplicating human speech through the utterance of the proper phonemes.

The cost of the VS-IV Voice Synthesizer is under \$2,000 in production quantities, positioning it considerably under conventional audio response devices, and suggests its use in applications where other units are impractical.

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## Quarter Sales Up at Inforex And Data 100

Two data entry firms that have switched to the operating method of accounting show soaring first quarter revenues from increased shipments. But the earnings columns are in the red, primarily because of this change.

Inforex of Burlington, Mass., helped by \$2.3 million in direct sales to Inforex Leasing II and foreign distributors, registered revenues of \$4.3 million, compared with \$33,000 in the same quarter last year. Losses were cut to \$193,901 or 12 cents a share, from last year's restated loss of \$1.2 million or 88 cents a share.

Data 100 of Minneapolis cited its "if sold dollar value" of terminal shipments in the quarter ended March 31 as \$5.7 million, compared with \$1 million for the comparable 1971 period.

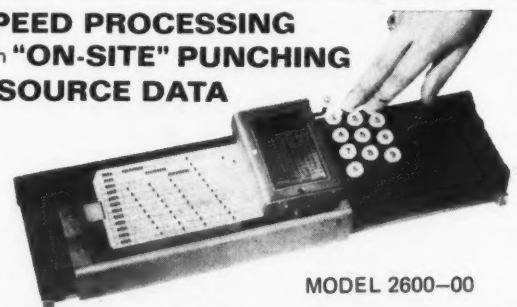
Revenues totaled \$1.7 million, compared with \$558,000 in the same period last year, but losses grew to \$1.9 million or \$1.47 a share compared with \$1.1 million or 96 cents a share in the year-ago quarter.

## SEL Shows Earnings

FORT LAUDERDALE, Fla. — Earnings rose considerably during the nine months at mini-maker Systems Engineering Laboratories, Inc. (SEL), despite relatively stable revenues.

For the period ended March 24, earnings, including an extraordinary tax credit of \$319,000, totaled \$898,000 or 35 cents a share compared with an adjusted loss of \$4.4 million or \$1.81 a share in the year-ago period.

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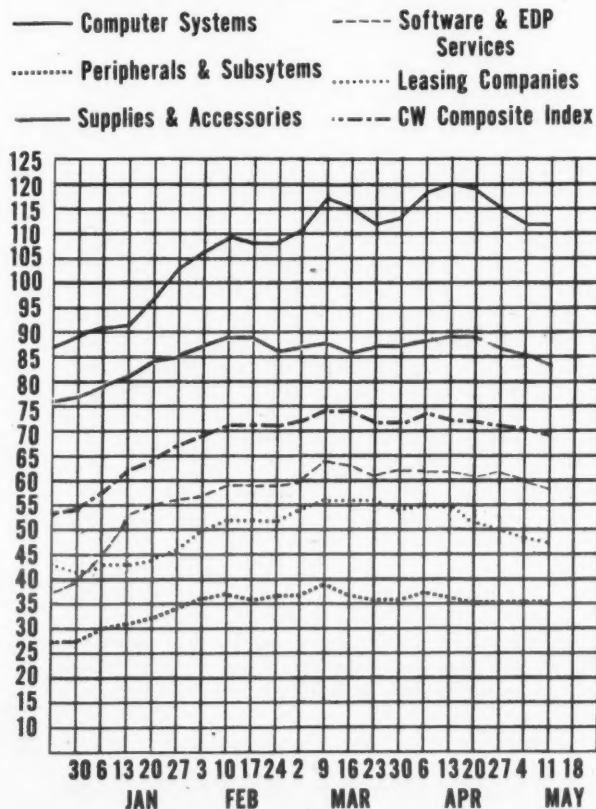
X C H	PRICE				X C H	PRICE					
	1972 RANGE (1)	CLOSE MAY 11 1972	WEEK NET CHNGE	WEEK PCT CHNGE		1972 RANGE (1)	CLOSE MAY 11 1972	WEEK NET CHNGE	WEEK PCT CHNGE		
SOFTWARE & EDP SERVICES											
O	ADVANCED COMP TECH	1- 2	1 3/8	+ 1/8	+10.0	O	REYNOLDS & REYNOLD	37- 77	39 3/4	+ 1/2	+1.2
A	APPLIED DATA RES.	5- 7	4 5/8	- 1/2	-9.7	O	STANDARD REGISTER	16- 20	16 -	1/2	-3.0
O	APPLIED LOGIC	1- 4	1 3/4	+ 1/4	+16.6	O	TAB PRODUCTS CO	14- 17	16 1/4	- 1/4	-1.5
N	AUTOMATIC DATA PROC	72- 91	81 1/2	-1 1/4	-1.5	N	UARCO	23- 28	23 1/4	- 3/4	-3.1
O	AUTO SCIENCES	1- 1	1/4	- 1/8	-33.3	A	WABASH MAGNETICS	8- 11	9 3/8	- 1/4	-2.5
O	COMPUTER DIMENSIONS	0- 14	8 -	1/2	-5.8	N	WALLACE BUS FORMS	23- 26	23 1/4	-1	-4.1
O	COMPUTER NETWORK	4- 7	4 1/4	0	0.0	COMPUTER SYSTEMS					
N	COMPUTER SCIENCES	8- 10	7 3/4	- 1/2	-6.0	N	BURROUGHS CORP	147-175	168 3/4	+ 1/4	+0.1
O	COMPUTER TECHNOLOGY	6- 8	7 -	1/4	-3.4	N	COLLINS RADIO	14- 20	17 1/4	+ 1/8	+0.7
O	COMPUTER USAGE	9- 14	11 1/4	-1 1/4	-10.0	N	CONTROL DATA CORP	43- 67	61 1/4	-1 3/4	-2.7
O	COMP AUTOMOT REPORTS	5- 9	4 3/4	-1 1/4	-20.8	O	DATA GENERAL CORP	56- 99	85 +1	1/2	+1.7
N	COMPUTING & SOFTWARE	21- 28	21 1/4	- 7/8	-3.9	O	DIGITAL COMP CONTROL	12- 25	12 -1	3/4	-12.7
O	COMRESS	1- 3	2 -	1/8	-5.8	N	DIGITAL EQUIPMENT	72- 97	85 1/2	+ 5/8	+0.7
O	COMSHARE	5- 10	9 + 3/4	+9.0		N	ELECTRONIC ASSOC.	6- 13	10 1/4	+ 1/8	+1.2
O	DATA AUTOMATION	1- 1	1/4	0	0.0	A	ELECTRONIC ENGINEER.	8- 14	9 3/8	+ 1/8	+1.3
O	DATAMATION SERVICE	1- 1	5/8	0	0.0	N	FOXBORO	34- 41	38 1/4	+ 3/8	+0.9
O	DATATAB	5- 9	6 1/2	- 1/4	-3.7	O	GENERAL AUTOMATION	13- 26	21 -	3/4	-3.4
O	EDP RESOURCES	4- 8	4 1/2	- 3/4	-14.2	N	HEWLETT-PACKARD CO	46- 60	56 +	1/2	+0.9
A	ELECT COMP PROG	3- 5	2 7/8	+ 1/8	+4.5	N	HONEYWELL INC	130-158	145 +2		+1.3
N	ELECTRONIC DATA SYS.	43- 63	54 5/8	- 5/8	-1.1	N	IBM	333-398	383 1/2	-1	-0.2
O	INFORMATICS	8- 11	8 1/4	0	0.0	O	INTERDATA INC	8- 16	10 7/8	+ 1/8	+1.1
O	I.O.A. DATA CORP	1- 2	2 1/4	- 1/8	-5.2	O	MICRODATA CORP	5- 10	7 3/4	+ 1/4	+3.3
A	ITEL	9- 12	9 1/8	+ 3/8	+4.2	N	NCR	29- 34	30 -	5/8	-2.0
O	KEANE ASSOCIATES	4- 7	5 1/2	- 1/2	-8.3	N	RAYTHEON CO	39- 47	41 -	3/4	-1.7
O	KEYDATA CORP	7- 11	10 1/2	- 1/4	-2.3	N	SPERRY RAND	30- 39	35 3/4	- 1/4	-0.6
O	LOGICON	4- 9	6 5/8	- 1/8	-1.8	A	SYSTEMS ENG. LABS	11- 16	12 1/4	-1	-7.5
A	MANAGEMENT DATA	6- 10	7 1/4	- 5/8	-7.9	N	VARIAN ASSOCIATES	14- 18	14 7/8	- 1/2	-3.2
O	NATIONAL CSS INC	8- 17	16 3/4	+ 3/4	+4.6	N	VICTOR COMPTOMETER	15- 24	20 1/4	+ 1/2	+2.5
O	NAT COMP ANALYSTS	1- 1	3/4	0	0.0	N	WANG LABS.	35- 59	53 1/2	+1 1/8	+2.1
P	ON LINE SYSTEMS INC.	8- 15	13 + 1/2	+4.0		N	XEROX CORP	121-146	137 3/8	+2 3/8	+1.7
N	PLANNING RESEARCH	13- 17	13 1/4	-1 1/4	-8.6	LEASING COMPANIES					
O	PROGRAMMING METHODS	22- 24	23 1/2	0	0.0	A	BOOTHE COMPUTER	8- 18	8 3/8	- 5/8	-6.4
O	PROGRAMMING & SYS	1- 2	1 1/4	- 1/4	-16.6	O	BRESNAHAN COMP.	2- 3	2 1/4	0	0.0
O	SCIENTIFIC COMPUTERS	3- 4	2 7/8	0	0.0	O	COMDISCO INC	6- 16	16 1/4	+1 3/4	+12.0
O	SIMPLICITY COMPUTER	1- 5	4 1/4	+ 1/8	+3.0	O	COMPUTER EXCHANGE	2- 2	2 1/4	0	0.0
O	SOFTWARE SYSTEMS	1- 3	1 3/8	0	0.0	A	COMPUTER INVSTRS GRP	8- 14	11 1/8	-1 1/8	-9.1
O	TBS COMPUTER CENTERS	4- 5	5 1/4	+ 1/2	+10.5	N	DPF INC	7- 13	7 3/4	+ 1/8	+1.6
O	TRACOR COMPUTING	2- 3	1 7/8	+ 1/8	+7.1	M	DATRONIC RENTAL	3- 4	3 -	1/8	-4.0
O	TYMSHARE INC	7- 10	7 1/8	- 1/2	-6.5	A	DCL INC	6- 10	6 1/4	- 3/8	-5.6
O	UNITED DATA CENTER	5- 8	7 1/2	- 1/4	-3.2	A	DEARBORN-STORM	18- 26	21 1/8	- 1/4	-1.1
N	UNIVERSITY COMPUTING	19- 26	21 5/8	-1 1/4	-5.4	A	DPA, INC.	5- 8	6 3/8	- 1/8	-1.9
A	URS SYSTEMS	6- 9	8 7/8	+ 1/8	+1.4	A	GRANITE MGT	8- 11	8 1/4	- 3/8	-4.3
D	VORTEX CORP	4- 5	2 1/2	0	0.0	A	GREYHOUND COMPUTER	8- 11	8 -	1/4	-3.0
PERIPHERALS & SUBSYSTEMS											
N	ADDRESSOGRAPH-MULT	34- 42	36 1/8	+ 1/4	+0.6	N	LEASCO CORP	19- 24	20 1/4	+ 1/4	+1.2
O	ALPHANUMERIC	1- 2	1/2	0	0.0	O	LECTRO MGT INC	2- 4	2 3/8	- 1/8	-5.0
N	AMPEX CORP	8- 15	7 7/8	+ 1/8	+1.6	O	NCC INDUSTRIES	8- 11	8 3/8	- 1/2	-5.6
O	ANDERSON JACOBSON	5- 8	5 7/8	- 1/8	-2.0	A	ROCKWOOD COMPUTER	4- 7	4 1/2	+ 1/4	+5.8
O	ATLANTIC TECHNOLOGY	3- 11	6 1/2	+ 1/4	+4.0	O	SYSTEMS CAPITAL	3- 14	12 1/4	- 3/8	-2.9
A	BOLT, BERANEK & NEW	5- 18	13 1/4	-1 1/8	-7.8	N	U.S. LEASING	36- 48	42 -1		-2.3
N	BUNKER-RAMO	9- 14	12 0	0.0		EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER P=PHIL-BALT-WASH O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID (1) TO NEAREST DOLLAR					
A	CALCOMP	19- 25	19 3/8	+ 1/4	+1.3	<b>Computer Stocks Trading Index</b>					
O	CENTRONICS DATA COMP	11- 39	34 1/2	+1	+2.9	Computer Systems					
O	COGNITRONICS	3- 5	2 3/4	- 1/8	-4.3	Software & EDP Services					
O	COMPUTER COMMUN.	3- 7	4 1/4	0	0.0	Peripherals & Subsystems					
A	COMPUTER EQUIPMENT	3- 4	3 1/2	- 1/8	-3.4	Leasing Companies					
O	COMPUTER MACHINERY	7- 13	10 1/4	-1	-8.8	Supplies & Accessories					
A	COMPUTEST	5- 9	5 3/8	- 1/8	-2.2	CW Composite Index					
O	CONSOL COMPUTER LTD.	1- 1	3/8	- 1/8	-25.0						
A	DATA PRODUCTS CORP	5- 7	5 1/4	- 1/8	-2.3						
O	DATA RECOGNITION	3- 5	3 3/4	0	0.0						
O	DATA TECHNOLOGY	3- 5	2 7/8	0	0.0						
O	DI/AN CONTROLS	0- 8	5 7/8	- 3/8	-6.0						
O	DIGITRONICS	3- 4	2 3/4	- 1/4	-8.3						
N	ELECTRONIC M & M	5- 8	5 1/2	+ 1/4	+4.7						
O	FARRI-TEK	2- 5	3 3/4	- 1/8	-3.2						
O	GENERAL COMPUTER SYS	7- 16	11 3/4	- 1/4	-2.0						
N	GENERAL ELECTRIC	59- 70	66 1/2	+ 1/4	+0.3						
N	HAZELTINE CORP	9- 13	10 3/8	0	0.0						
O	INFOREX INC	28- 47	39 + 1/2	+1.2							
O	INFORMATION DISPLAYS	3- 5	2 5/8	- 1/8	-4.5						
O	MANAGEMENT ASSIST	1- 2	7/8	- 1/8	-12.5						
N	MEMOREX	27- 38	33 +1 1/2	+4.7							
A	MILGO ELECTRONICS	17- 39	34 1/2	-1	-2.8						
N	MOHAWK DATA SCI	20- 27	24 - 1/2	-2.0							
O	OPTICAL SCANNING	7- 16	11 1/2	-1	-8.0						
O	PERTEC CORP	11- 17	10 1/2	0	0.0						
O	PHOTON	7- 15	11 7/8	- 5/8	-5.0						
A	POTTER INSTRUMENT	15- 21	15 5/8	- 1/2	-3.1						
O	PRECISION INST.	7- 13	11 - 3/4	-6.3							
O	RECOGNITION EQUIP	10- 15	9 5/8	- 1/4	-2.5						
N	SANDERS ASSOCIATES	16- 21	16 5/8	+1	+6.3						
O	SCAN DATA	9- 13	10 1/4	- 7/8	-7.8						
O	STORAGE TECHNOLOGY	17- 27	24 1/2	+4 7/8	+24.8						
O	SYCOR INC	7- 10	7 0	0.0	0.0						
O	TALLY CORP.	8- 13	8 1/2	0	0.0						
N	TEKTRONIX INC	34- 50	45 1/2	-1	-2.1						
N	TELEX	10- 15	9 7/8	- 1/8	-1.2						
SUPPLIES & ACCESSORIES											
O	BALTIMORE BUS FORMS	6- 9	7 1/2	-1	-11.7						
A	BARRY WRIGHT	9- 13	10 3/8	- 3/8	-3.4						
A	DATA DOCUMENTS	17- 26	23 -1	-4.1							
O	DUPLEX PRODUCTS INC	12- 16	11 7/8	- 3/4	-5.9						
N	ENNIS BUS. FORMS	7- 9	8 1/4	+ 1/8	+1.5						
O	GRAHAM MAGNETICS	15- 27	19 3/8	- 1/8	-0.6						
O	GRAPHIC CONTROLS	12- 15	14 0	0.0	0.0						
N	3M COMPANY	129-149	142 1/2	+2 1/2	+1.7						
N	MOORE BUS. FORMS	42- 48	47 1/2	+ 1/4	+0.5						
N	NASHUA CORP	48- 56	51 + 3/4	+1.4							

30 6 13 20 27 3 10 17 24 2 9 16 23 30 6 13 20 27 4 11 18

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(1) TO NEAREST DOLLAR

## Computer Stocks Trading Index



## Earnings Report

DATA TRENDS			
Six Months Ended Dec. 31			
	1971	a1970	
Shr Ernd	.....	.....	\$24
Revenue	\$1,818,547	4,179,954	
Earnings	(1,104,228)	220,893	

a-Restated.

DPA			
Three Months Ended Feb. 29			
	1972	a1971	
Shr Ernd	.....	.....	\$13
Revenue	8,206,884	\$8,909,646	
Earnings	322,518	(1,024,840)	

a-Restated to reflect change in depreciation methods.

COMPUGRAPHIC			
Three Months Ended April 1			
	1972	a1971	
Shr Ernd	.....	.....	\$20
Revenue	6,339,000	5,118,000	
Tax Cred	.....	.....	48,000
Earnings	354,000	170,000	
6 Mo Shr	.....	.....	.33
Revenue	11,899,000	10,005,000	
Tax Cred	.....	.....	105,000
Earnings	578,000	378,000	

a-Restated.

NATIONAL COMPUTER SYSTEM			
Year Ended Jan. 31			
	1972	a1971	
Shr Ernd	.....	.....	\$42
Revenue	4,388,908	\$3,970,862	
Tax Cred	111,472	.....	
Earnings	226,363	(705,871)	

a-Restated.

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## **Westinghouse 2550 Satellite Processor**

### **Both an intelligent remote-batch terminal and local-batch processor**

As a remote-batch terminal, the Westinghouse 2550 Satellite Processor emulates 2780s, HASP multileaving work stations and other popular RJE terminals. No reprogramming of your host processor or front-end system is required.

In addition to this compatibility, the 2550 Satellite Processor increases performance. It improves terminal throughput with higher speed peripherals, faster data rates, data compression, and mass-memory devices for remote spooling.

Offline, the 2550 Satellite Processor provides fast, low-cost batch processing for your scientific, engineering, and business needs. Software support packages include FORTRAN, BASIC, RPG, and numerous assemblers.

Most important, the Westinghouse 2550 Satellite Processor has enthusiastic user acceptance, and is available now! Take advantage of Westinghouse experience as a supplier and as a user. You get single-source leasing, maintenance, and nationwide sales and service. For the answer to your needs, call Westinghouse Computer and Instrumentation Division, Computer Department, Orlando, Florida. 305 843-7030.

**You can be sure...if it's Westinghouse**

